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Deliverable Review Form

1 ***Project Information:***

Project Name: Olin Chemical Superfund Site

Project Number: 6107-11-0016 Project Manager: Peter Thompson

Document Name: Data Validation Report - November 2011 Slurry Wall / Cap

Document Revision Number: _____ Revision Date: _____

Prepared By: _____

2 ***Technical Review:*** This document has been independently reviewed for technical adequacy, validity, feasibility, continuity, and conformance to client requirements and accepted professional standards. Technical review of this document has been performed by:

Subject Area(s): Initial Data Validation

Printed Name: Wolfgang Colucha

Signature: _____ Date: 12/9/2011

Subject Area(s): Senior Data Validation

Printed Name: Chris Ricardi

Signature: _____ Date: 12/15/11

Subject Area(s): QC Review

Printed Name: Kelly Chatterton

Signature: _____ Date: 1/09/12

3 ***Tables/Figures/Appendices (including calculations) Review:*** Independently reviewed for technical adequacy, continuity, and conformance to regulatory requirements and accepted professional standards (use back of form if more room is needed). Reviews performed by:

List of reviewed Tables/Figures/Appendices: Table 1 - Sample Summary

Created by: hjc KJC 12/05/11 Checked by: _____ Date: 12/14/11

List of reviewed Tables/Figures/Appendices: Table 2 - Final Results Summary

Created by: hjc KJC 12/05/11 Checked by: _____ Date: 12/14/11

List of reviewed Tables/Figures/Appendices: Table 3 - Validation Qualification Action Summary

Created by: hjc KJC 12/05/11 Checked by: _____ Date: 12/14/11

List of reviewed Tables/Figures/Appendices: _____

Created by: _____ Checked by: _____ Date: _____

4 ***Certifying Project Manager:*** I certify that this document has been reviewed and edited prior to release and is in conformance with the company's standards for technical and document quality:

Print Name: Peter Thompson

Signature: _____ Date: _____

5 ***Certifying Project Principal:*** I certify that this document has been reviewed and edited prior to release and is in conformance with the company's standards for technical and document quality:

Print Name: Michael Murphy

Signature: _____ Date: 1/12/12

6 *Policy ES-4* ***Contract Requirements: Contract = Contract, Subcontract, Work Order, Change Order, or PO***

- [ ] NA
- [ ] This is a Standard Contract
- [ ] This is a Non-Standard Contract * and was checked & stamped by an OCA or MACTEC Attorney

* Client-generated contracts and/or any mods to PWAS/other standard company contracts shall be reviewed by an OCA. See Policies LD-6, LD-7 and LD-30 for more information.

All Contracts - Client must sign two copies of the contract first, then return them to MACTEC for our signature on both copies. MACTEC returns one signed contract to Client, and stamps one File Copy for MACTEC's project files.)

Back of form to be completed by Annette\Project Assistant.

Deliverable Review Form (Continued)

Sections 7-9 to be Completed by Annette\Project Assistant

7 ***Copy Editing:*** This document has been checked to ensure correct spelling, grammar, and word usage; completeness (no missing text, figures, tables); accuracy (index, page numbers, internal references); continuity of style; and conformance to specified format and style requirements (whether MACTEC format or client requested format). Copy editing of this document was performed by:

Print Name: Annette Savastano

Signature: Annette Savastano Date: 1/10/12

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AMEC E&I, Inc.
107 Audubon Road, Building 2, Suite 301
Wakefield, Massachusetts 01880
Phone No.: (781) 245-6606
FAX No. : (781) 246-5060

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TRANSMITTAL LETTER

To: James Cashwell	Date: January 12, 2012
Olin Corporation	Client: Olin
3855 North Ocoee Street	Project: 51 Eames Street, Wilmington, MA
Suite 200	
Cleveland, Tennessee 37312	AMEC PN: 6107-11-0016.12
	Delivery: U.S.P.S.

x information ☐ purchasing
☐ estimating ☐ construction
☐ comments and/or approval ☐ see remarks

REMARKS: Enclosed please find the following data validation summary reports (on CD) for the 51 Eames Street, Wilmington, MA property.

Please feel free to contact Mike Murphy at (781) 245-6606 if you have any questions regarding the enclosed report.

Prepared By: Annette Savastano AMS

Number	Revision No.	No. of Copies	Title or Description
1	-	1	Data Validation Report, October 2011 Monthly Plant B RGP, Olin Chemical Superfund Site, Wilmington, Massachusetts, TestAmerica Laboratories Data Set: 360-37208-1
2	-	1	Data Validation Report, November 2011 Slurry Wall Groundwater, Surface Water and Sediment, Olin Chemical Superfund Site, Wilmington, Massachusetts, TestAmerica Laboratories Data Sets: 360-37491-1, 360-37526-1, 360-37552-1, 360-37595-1, and 360-37596-1
3	-	1	Data Validation Report, November 2011 Monthly Plant B RGP, Olin Chemical Superfund Site, Wilmington, Massachusetts, TestAmerica Laboratories Data Set: 360-37684-1
4	-	1	Data Validation Report, November 2011 Plant B Quarterly Groundwater, Olin Chemical Superfund Site, Wilmington, Massachusetts, TestAmerica Laboratories Data Sets: 360-37496-1, 360-37553-1, and 360-37525-1

DISTRIBUTION: T = TRANSMITTAL LETTER; C = COPY OF DOCUMENT

	T	C		T	C	
Brian Guichard, Olin Wilmington (CDs)	X	X				
AMEC Project File	X	X				

To: James Cashwell
From: Chris Ricardi
Date: January 10, 2012
Subject: Interim Response Steps Work Plan Slurry Wall Monitoring Program 4Q11 – November 2011

DATA VALIDATION REPORT
NOVEMBER 2011 SLURRY WALL GROUNDWATER, SURFACE WATER AND SEDIMENT
OLIN CHEMICAL SUPERFUND SITE
WILMINGTON, MASSACHUSETTS
TestAmerica Laboratories Data Sets 360-37491-1, 360-37526-1, 360-37552-1, 37595-1, and 360-37596-1

1.0 INTRODUCTION

Groundwater, surface water, and sediment samples were collected from the Olin Chemical Superfund Site from November 8 to November 11, 2011. Samples were analyzed by TestAmerica Laboratories in Westfield, Massachusetts. Data were reported in sample delivery groups (SDGs) 360-37491-1, 360-37526-1, 360-37552-1, 360-37595-1, and 360-37596-1. A summary of samples included in this review is contained in Table 1. Samples reviewed in this report were analyzed for the following U.S. Environmental Protection Agency (USEPA) SW-846 (USEPA, 1996), USEPA wastewater (USEPA, 1993), or Standard Methods (APHA, 1995):

- dissolved metals (aluminum and chromium) by USEPA Method 6010B in groundwater
- dissolved and total metals (aluminum, chromium, and sodium) by USEPA Method 6010B in surface water
- total metals (aluminum, chromium, and iron) By USEPA Method 6010B in sediment
- general chemistry analyses for ammonia by USEPA Method 350.1 (Lachat 10-107-06-1B), chloride, nitrate, nitrite, and sulfate by USEPA Method 300, and specific conductance by SM 2510B

The Final Interim Response Steps Work Plan (IRSWP) MACTEC Engineering and Consulting, Inc. (MACTEC, 2007) and the Massachusetts Department of Environmental Protection (MassDEP) Compendium of Quality Assurance and Quality Control Requirements and Performance Standards for Selected Analytical Methods Used in Support of Response Actions for the Massachusetts Contingency Plan (MCP) (MassDEP, 2010) were used as references during the review. Analytical packages were reviewed using the Level 1 Data Quality Evaluation checklists that were developed for the Olin Wilmington monitoring tasks. Final sample results are presented on data summaries in Table 2. A summary of data validation actions and associated qualifier reason codes is presented on Table 3.

Environment & Infrastructure
107 Audubon Road, Suite 301 • Wakefield, MA 01880 USA
Tel: 781.245.6606 • Fax: 781.246.5060

2.0 METALS

Data were reviewed for the following parameters:

* Data Completeness
* Holding Time
* Blanks
  Laboratory Control Sample/Laboratory Control Sample Duplicate Analysis
* Matrix Spike Analysis
* Field Duplicate Results
* Detection Limits
  Dissolved vs. Total Metals Comparison

***** **=** indicates that criteria were met for this parameter

Laboratory Control Sample/Laboratory Control Sample Duplicate Analysis

SDG 360-37595-1

The LCS/LCSD percent recoveries of aluminum (170, 169, 197, and 221) and iron (154, 156, 167, and 176) exceeded the upper QC limit of 120. Sample results for aluminum and iron were qualified estimated (J).

Dissolved vs. Total Metals Comparison

SDG 360-37491-1

Dissolved sodium concentrations were over ten percent greater than total sodium concentrations in a subset of surface water samples in SDG 360-37491-1 as presented in the table below. The results for total and dissolved sodium in these samples were qualified estimated (J).

SDG	Fraction	Lab Sample ID	Field Sample ID	Sodium Result (µg/L)	% Dissolved amount is greater than Total amount	Final Qualifier
360-37491-1	Dissolved	360-37491-2	OC-SW-ISCO1	98000	19	J
360-37491-1	Total	360-37491-2	OC-SW-ISCO1	89000		J
360-37491-1	Dissolved	360-37491-4	OC-SW-PZ-16RR	130000	18	J
360-37491-1	Total	360-37491-4	OC-SW-PZ-16RR	93000		J
360-37491-1	Dissolved	360-37491-5	OC-SW-PZ-17RR	140000	17	J
360-37491-1	Total	360-37491-5	OC-SW-PZ-17RR	120000		J
360-37491-1	Dissolved	360-37491-7	OC-SW-SD-17	140000	17	J
360-37491-1	Total	360-37491-7	OC-SW-SD-17	120000		J
360-37491-1	Dissolved	360-37491-8	OC-SW-PZ-18R-DUP	96000	16	J
360-37491-1	Total	360-37491-8	OC-SW-PZ-18R-DUP	83000		J

3.0 GENERAL CHEMISTRY – Ammonia, Chloride, Sulfate, Nitrate, Nitrite, and Specific Conductance

Data were reviewed for the following parameters:

* Data Completeness
* Holding Time
* Blanks
* Matrix Spike Analysis
* Field Duplicate Analysis
* Laboratory Duplicate Analysis
* Laboratory Control Sample/Laboratory Control Sample Duplicate Analysis
  Detection Limits

* = indicates that criteria were met for this parameter

Detection Limits

SDG 360-37491-1

Samples OC-SW-ISCO3, OC-SW-PZ16RR, and OC-SW-PZ17RR were analyzed at a dilution due to chloride, and the reporting limits for nitrite are elevated.

Unless discussed above, sample results are interpreted to be usable as reported by TestAmerica.

Chris Ricardi

1/10/2012

Chris Ricardi, NRCC-EAC
Senior Chemist

Date

MJ Murphy

1/12/12

Michael Murphy
Project Principal

Date

References:

American Public Health Association (APHA), 1995. "Standard Methods for Examination of Water and Wastewater"; 19th Edition; APHA, 1015 Fifteenth St., NW. Washington, D.C. 20005.

MACTEC Engineering and Consulting, Inc. (MACTEC), 2007. "Final Interim Response Steps Work Plan"; Olin Chemical Superfund Site; 51 Eames Street, Wilmington, Massachusetts; August 8, 2007.

Massachusetts Department of Environmental Protection (MassDEP), 2010. "The Compendium of Quality Assurance and Quality Control Requirements and Performance Standards for Selected Analytical Methods Used in Support of Response Actions for the Massachusetts Contingency Plan (MCP)"; Bureau of Waste Site Cleanup; 1 Winter Street, Boston, Massachusetts 02108; WSC-CAM; July 2010.

U.S. Environmental Protection Agency (USEPA), 1993. "Methods for Chemical Analysis and Water and Wastes (MCAWW)", EPA/600/4-79-020 (March 1983) with updates and supplements EPA/600/4-91-010 (June 1991), EPA/600/R-92-129 (August 1992) and EPA/600/R-93-100 (August 1993).

USEPA, 1996. "Test Methods for Evaluating Solid Waste"; Laboratory Manual Physical/Chemical Methods; Office of Solid Waste and Emergency Response; Washington, DC; SW-846; November 1986; Revision 4 -December 1996.

Table 1
Sample Summary
Data Validation Report
November 2011 Slurry Wall / Cap Groundwater, Surface Water and Sediment
Olin Chemical Superfund Site
Wilmington, Massachusetts

Lab Sample ID	Location	Sample ID	Sample Date	SW846 6010B Total	SW846 6010B Filtered	E350.1 (QuickChem 10-107-06-1-B)	A2510B	40CFR136A 300.0
Groundwater								
360-37526-1	GW-78S	OC-GW-78S	11/9/2011		2	1	1	2
360-37526-2	GW-35S	OC-GW-35S	11/9/2011		2	1	1	2
360-37526-3	GW-201S	OC-GW-201S	11/9/2011		2	1	1	2
360-37526-4	GW-201S	OC-GW-201S-DUP	11/9/2011		2	1	1	2
360-37526-5	GW-79S	OC-GW-79S	11/9/2011		2	1	1	2
360-37526-6	PZ-16RR	OC-PZ-16RR	11/9/2011		2	1	1	2
360-37526-7	PZ-17RR	OC-PZ-17RR	11/9/2011		2	1	1	2
360-37526-8	PZ-18R	OC-PZ-18R	11/9/2011		2	1	1	2
360-37552-1	GW-CA1	OC-GW-CA1	11/10/2011		2	1	1	2
360-37552-2	GW-42S	OC-GW-42S	11/10/2011		2	1	1	2
360-37552-3	GW-43SR	OC-GW-43SR	11/10/2011		2	1	1	2
360-37552-4	GW-34SR	OC-GW-34SR	11/10/2011		2	1	1	2
360-37552-5	GW-34D	OC-GW-34D	11/10/2011		2	1	1	2
360-37552-6	GW-202S	OC-GW-202S	11/10/2011		2	1	1	2
360-37552-7	GW-202D	OC-GW-202D	11/10/2011		2	1	1	2
360-37552-8	PZ-24	OC-PZ-24	11/10/2011		2	1	1	2
360-37552-9	PZ-25	OC-PZ-25	11/10/2011		2	1	1	2
360-37596-1	GW-26	OC-GW-26	11/11/2011		2	1	1	2
360-37596-2	GW-10s	OC-GW-10s	11/11/2011		2	1	1	2
360-37596-3	GW-76s	OC-GW-76s	11/11/2011		2	1	1	2
360-37596-4	GW-24	OC-GW-24	11/11/2011		2	1	1	2
360-37596-5	GW-25	OC-GW-25	11/11/2011		2	1	1	2
Surface Water								
360-37491-1	ISCO1	OC-SW-ISCO1	11/8/2011	3	3	1	1	4
360-37491-2	ISCO2	OC-SW-ISCO2	11/8/2011	3	3	1	1	4
360-37491-3	ISCO3	OC-SW-ISCO3	11/8/2011	3	3	1	1	4
360-37491-4	PZ-16RR	OC-SW-PZ16RR	11/8/2011	3	3	1	1	4
360-37491-5	PZ-17RR	OC-SW-PZ17RR	11/8/2011	3	3	1	1	4
360-37491-6	PZ-18R	OC-SW-PZ18R	11/8/2011	3	3	1	1	4
360-37491-7	SD-17	OC-SW-SD17	11/8/2011	3	3	1	1	4
360-37491-8	PZ-18R	OC-SW-PZ18R-DUP	11/8/2011	3	3	1	1	4

Table 1
Sample Summary
Data Validation Report
November 2011 Slurry Wall / Cap Groundwater, Surface Water and Sediment
Olin Chemical Superfund Site
Wilmington, Massachusetts

Lab Sample ID	Location	Sample ID	Sample Date	SW846 6010B Total	SW846 6010B Filtered	E350.1 (QuickChem 10-107-06-1-B)	A2510B	40CFR136A 300.0
Sediment								
360-37595-1	SD-SD1	OC-SD-SD1-0.0/0.5	11/11/2011	3				
360-37595-2	SD-SD2	OC-SD-SD2-0.0/0.5	11/11/2011	3				
360-37595-3	SD-SD3	OC-SD-SD3-0.0/0.5	11/11/2011	3				
360-37595-4	SD-SD3	OC-SD-SD3 DUP-0.0/0.5	11/11/2011	3				
360-37595-5	SD-SD4	OC-SD-SD4-0.0/0.5	11/11/2011	3				
360-37595-6	SD-SD5	OC-SD-SD5-0.0/0.5	11/11/2011	3				

Notes:
Number listed under method indicates number of target analytes reported.

Prepared by / Date: KJC 12/05/11
Checked by / Date: WDC 12/14/11

Table 2
Final Results Summary
November 2011 Slurry Wall / Cap Groundwater, Surface Water and Sediment
Olin Chemical Superfund Site
Wilmington, Massachusetts

			Loc Name	GW-10S		GW-201S		GW-201S		GW-202D		GW-202S		GW-24		GW-25		GW-26	
			Field Sample ID	OC-GW-10s		OC-GW-201S		OC-GW-201S-DUP		OC-GW-202D		OC-GW-202S		OC-GW-24		OC-GW-25		OC-GW-26	
			Field Sample Date	11/11/11		11/09/11		11/09/11		11/10/11		11/10/11		11/11/11		11/11/11		11/11/11	
			QC Code	FS		FS		FD		FS		FS		FS		FS		FS	
			Lab Sample Delivery Group	360-37596-1		360-37526-1		360-37526-1		360-37552-1		360-37552-1		360-37596-1		360-37596-1		360-37596-1	
Frac	**Method**	**Analyte**	**Units**	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
F	SW6010	Aluminum	ug/l	3600		100	U	100	U	13000		100	U	100	U	100	U	100	U
F	SW6010	Chromium	ug/l	5	U	16		16		1000		4.8	J	5	U	2.4	J	6.1	
N	E300	Chloride	mg/l	20		77		81		260		45		13		110		330	
N	E300	Sulfate	mg/l	69		1400		1300		1700		330		53		96		32	
N	LACH_107_06_1_B	Nitrogen, as Ammonia	mg/l	4		180		150		300		60		36		36		47	
N	A2510B	LAB SPECIFIC CONDUCTANC	umhos/cm	220		3100		3100		4400		1100		340		770		1200	

Notes:

N = normal

F = filtered

FS = field sample

FD = field duplicate

U = not detected, value is the detection limit

J = value is estimated

ug/l = microgram per liter

mg/l = milligram per liter

umhos/cm = micro reciprocal ohms per centimeter

Table 2
Final Results Summary
November 2011 Slurry Wall / Cap Groundwater, Surface Water and Sediment
Olin Chemical Superfund Site
Wilmington, Massachusetts

			Loc Name	GW-34D		GW-34SR		GW-35S		GW-42S		GW-43SR		GW-76S		GW-78S		GW-79S	
			Field Sample ID	OC-GW-34D		OC-GW-34SR		OC-GW-35S		OC-GW-42S		OC-GW-43SR		OC-GW-76s		OC-GW-78S		OC-GW-79S	
			Field Sample Date	11/10/11		11/10/11		11/09/11		11/10/11		11/10/11		11/11/11		11/09/11		11/09/11	
			QC Code	FS		FS		FS		FS		FS		FS		FS		FS	
			Lab Sample Delivery Group	360-37552-1		360-37552-1		360-37526-1		360-37552-1		360-37552-1		360-37596-1		360-37526-1		360-37526-1	
Frac	**Method**	**Analyte**	**Units**	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
F	SW6010	Aluminum	ug/l	200	U	100	U	26	J	450		53	J	100	U	100	U	13	J
F	SW6010	Chromium	ug/l	15		1.4	J	21		7.9		1.2	J	2.3	J	2.6	J	9	
N	E300	Chloride	mg/l	4.9		2.3		6.7		120		180		4.3		27		140	
N	E300	Sulfate	mg/l	60		7.9		200		12		32		38		450		1200	
N	LACH_107_06_1_B	Nitrogen, as Ammonia	mg/l	20		0.21		37		1		2.5		6.7		52		110	
N	A2510B	LAB SPECIFIC CONDUCTANC	umhos/cm	250		79		1000		500		730		150		1300		2800	

Notes:

N = normal

F = filtered

FS = field sample

FD = field duplicate

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J = value is estimated

ug/l = microgram per liter

mg/l = milligram per liter

umhos/cm = micro reciprocal ohms per centimeter

Table 2
Final Results Summary
November 2011 Slurry Wall / Cap Groundwater, Surface Water and Sediment
Olin Chemical Superfund Site
Wilmington, Massachusetts

			Loc Name	GW-CA1		PZ-16RR		PZ-17RR		PZ-18R		PZ-24		PZ-25	
			Field Sample ID	OC-GW-CA1		OC-PZ-16RR		OC-PZ-17RR		OC-PZ-18R		OC-PZ-24		OC-PZ-25	
			Field Sample Date	11/10/11		11/09/11		11/09/11		11/09/11		11/10/11		11/10/11	
			QC Code	FS		FS		FS		FS		FS		FS	
			Lab Sample Delivery Group	360-37552-1		360-37526-1		360-37526-1		360-37526-1		360-37552-1		360-37552-1	
Frac	**Method**	**Analyte**	**Units**	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
F	SW6010	Aluminum	ug/l	17	J	100	U	100	U	100	U	100	U	100	U
F	SW6010	Chromium	ug/l	6.6		7.2		7.3		11		18		9.9	
N	E300	Chloride	mg/l	9.6		170		24		150		23		21	
N	E300	Sulfate	mg/l	93		1100		400		200		690		490	
N	LACH_107_06_1_B	Nitrogen, as Ammonia	mg/l	0.77		250		48		62		73		51	
N	A2510B	LAB SPECIFIC CONDUCTANCE	umhos/cm	690		3000		1300		1200		2000		1400	

Notes:

N = normal

F = filtered

FS = field sample

FD = field duplicate

U = not detected, value is the detection limit

J = value is estimated

ug/l = microgram per liter

mg/l = milligram per liter

umhos/cm = micro reciprocal ohms per centimeter

Prepared by / Date: KJC 12/09/11

Checked by / Date: WDC 12/14/11

Table 2
Final Results Summary
November 2011 Slurry Wall / Cap Groundwater, Surface Water and Sediment
Olin Chemical Superfund Site
Wilmington, Massachusetts

			Loc Name	ISCO1		ISCO2		ISCO3		PZ-16RR		PZ-17RR		PZ-18R		PZ-18R		SD-17	
			Field Sample ID	OC-SW-ISCO1		OC-SW-ISCO2		OC-SW-ISCO3		OC-SW-PZ16RR		OC-SW-PZ17RR		OC-SW-PZ18R		OC-SW-PZ18R-DUP		OC-SW-SD17	
			Field Sample Date	11/08/11		11/08/11		11/08/11		11/08/11		11/08/11		11/08/11		11/08/11		11/08/11	
			QC Code	FS		FS		FS		FS		FS		FS		FD		FS	
			Lab Sample Delivery Group	360-37491-1		360-37491-1		360-37491-1		360-37491-1		360-37491-1		360-37491-1		360-37491-1		360-37491-1	
Frac	**Method**	**Analyte**	**Units**	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
F	SW6010	Aluminum	ug/l	150		130		28	J	69	J	110		170		180		1900	
F	SW6010	Chromium	ug/l	13		27		5	U	23		55		14		15		370	
F	SW6010	Sodium	ug/l	98000		100000	J	100000		130000	J	140000	J	96000		96000	J	140000	J
N	E300	Chloride	mg/l	120		97		170		120		130		120		120		130	
N	E300	Nitrate as N	mg/l	0.2		1.1		1		1.8		1.8		0.2		0.2		1.7	
N	A4500_NO2_B	Nitrite as N	mg/l	0.01	U	0.01	U	0.1	U	0.1	U	0.1	U	0.01	U	0.01	U	0.01	U
N	E300	Sulfate	mg/l	110		180		33		160		180		120		110		190	
N	LACH_107_06_1_B	Nitrogen, as Ammonia	mg/l	25		33		1.7		31		33		30		29		32	
N	A2510B	LAB SPECIFIC CONDUCTANCE	umhos/cm	760		860		740		950		1000		780		780		1000	
T	SW6010	Aluminum	ug/l	330		4000		200		1800		2000		270		260		2100	
T	SW6010	Chromium	ug/l	30		750		2	J	380		470		22		21		470	
T	SW6010	Sodium	ug/l	89000		84000	J	93000		110000	J	120000	J	88000		83000	J	120000	J

Notes:

Prepared by / Date: KJC 12/09/11

Checked by / Date: WDC 12/14/11

N = normal

T = total (unfiltered)

F = filtered

FS = field sample

FD = field duplicate

U = not detected, value is the detection limit

J = value is estimated

ug/l = microgram per liter

mg/l = milligram per liter

umhos/cm = micro reciprocal ohms per centimeter

Table 2
Final Results Summary
November 2011 Slurry Wall / Cap Groundwater, Surface Water and Sediment
Olin Chemical Superfund Site
Wilmington, Massachusetts

			Loc Name	SD-SD1		SD-SD2		SD-SD3		SD-SD3		SD-SD4		SD-SD5	
			Field Sample ID	OC-SD-SD1-0.0/0.5		OC-SD-SD2-0.0/0.5		OC-SD-SD3 DUP-0.0/0.5		OC-SD-SD3-0.0/0.5		OC-SD-SD4-0.0/0.5		OC-SD-SD5-0.0/0.5	
			Field Sample Date	11/11/11		11/11/11		11/11/11		11/11/11		11/11/11		11/11/11	
			QC Code	FS		FS		FD		FS		FS		FS	
			Lab Sample Delivery Group	360-37595-1		360-37595-1		360-37595-1		360-37595-1		360-37595-1		360-37595-1	
Frac	**Method**	**Analyte**	**Units**	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
T	SW6010	Aluminum	mg/kg	11000	J	11000	J	9800	J	9700	J	9900	J	11000	J
T	SW6010	Chromium	mg/kg	30		130		45		35		140		59	
T	SW6010	Iron	mg/kg	13000	J	14000	J	14000	J	14000	J	17000	J	15000	J
N	E160.3	Percent Moisture	percent	29		25		26		28		34		27	
N	E160.3	Percent Solids	percent	71		75		74		72		66		73	

Notes:

N = normal

T = total (unfiltered)

FS = field sample

FD = field duplicate

J = value is estimated

mg/kg = milligram per kilogram

Prepared by / Date: KJC 12/09/11

Checked by / Date: WDC 12/14/11

Table 3
Validation Qualification Action Summary
Data Validation Report
November 2011 Slurry Wall / Cap Groundwater, Surface Water and Sediment
Olin Chemical Superfund Site
Wilmington, Massachusetts

SDG	Lab Sample ID	Analytical Method	Fraction	Field Sample ID	Parameter	Lab Result	Lab Qualifier	Final Result	Final Qualifier	Val Reason Code	Units
360-37595-1	360-37595-1	SW6010	T	OC-SD-SD1-0.0/0.5	Aluminum	11000	B	11000	J	LCS-H	mg/kg
360-37595-1	360-37595-1	SW6010	T	OC-SD-SD1-0.0/0.5	Iron	13000	B	13000	J	LCS-H	mg/kg
360-37595-1	360-37595-2	SW6010	T	OC-SD-SD2-0.0/0.5	Aluminum	11000	B	11000	J	LCS-H	mg/kg
360-37595-1	360-37595-2	SW6010	T	OC-SD-SD2-0.0/0.5	Iron	14000	B	14000	J	LCS-H	mg/kg
360-37595-1	360-37595-3	SW6010	T	OC-SD-SD3-0.0/0.5	Aluminum	9700	B	9700	J	LCS-H	mg/kg
360-37595-1	360-37595-3	SW6010	T	OC-SD-SD3-0.0/0.5	Iron	14000	B	14000	J	LCS-H	mg/kg
360-37595-1	360-37595-4	SW6010	T	OC-SD-SD3 DUP-0.0/0.5	Aluminum	9800		9800	J	LCS-H	mg/kg
360-37595-1	360-37595-4	SW6010	T	OC-SD-SD3 DUP-0.0/0.5	Iron	14000	B	14000	J	LCS-H	mg/kg
360-37595-1	360-37595-5	SW6010	T	OC-SD-SD4-0.0/0.5	Aluminum	9900	B	9900	J	LCS-H	mg/kg
360-37595-1	360-37595-5	SW6010	T	OC-SD-SD4-0.0/0.5	Iron	17000	B	17000	J	LCS-H	mg/kg
360-37595-1	360-37595-6	SW6010	T	OC-SD-SD5-0.0/0.5	Aluminum	11000		11000	J	LCS-H	mg/kg
360-37595-1	360-37595-6	SW6010	T	OC-SD-SD5-0.0/0.5	Iron	15000	B	15000	J	LCS-H	mg/kg
360-37491-1	360-37491-2	SW6010	D	OC-SW-ISCO2	Sodium	100000		100000	J	TD	ug/L
360-37491-1	360-37491-2	SW6010	T	OC-SW-ISCO2	Sodium	84000		84000	J	TD	ug/L
360-37491-1	360-37491-4	SW6010	T	OC-SW-PZ16RR	Sodium	110000		110000	J	TD	ug/L
360-37491-1	360-37491-4	SW6010	D	OC-SW-PZ16RR	Sodium	130000		130000	J	TD	ug/L
360-37491-1	360-37491-5	SW6010	D	OC-SW-PZ17RR	Sodium	140000		140000	J	TD	ug/L
360-37491-1	360-37491-5	SW6010	T	OC-SW-PZ17RR	Sodium	120000		120000	J	TD	ug/L
360-37491-1	360-37491-7	SW6010	T	OC-SW-SD17	Sodium	120000	B	120000	J	TD	ug/L
360-37491-1	360-37491-7	SW6010	D	OC-SW-SD17	Sodium	140000		140000	J	TD	ug/L
360-37491-1	360-37491-8	SW6010	D	OC-SW-PZ18R-DUP	Sodium	96000		96000	J	TD	ug/L
360-37491-1	360-37491-8	SW6010	T	OC-SW-PZ18R-DUP	Sodium	83000	B	83000	J	TD	ug/L

Units:
ug/L = microgram per liter
mg/kg = milligram per kilogram

Validation Reason Codes:
LCS-H = LCS recovery high
TD = Dissolved concentration exceeds total

Prepared by / Date: KJC 12/09/11
Checked by / Date: WDC 12/14/11

Validation Qualifier:
J = Value is estimated

OLIN-WILMINGTON
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
ICP METALS BY METHOD 6010B/200.7

Reviewer/Date [signature] 12/7/11
Sr. Review/Date Chris Ricardi 1/4/12
Lab Report # 360-37526-1
Project # 6107110016.12

dissolved aluminum + chromium

1.0 Laboratory Deliverable Requirements

1.1 Laboratory Information: Was all of the following provided in the laboratory report? **Yes** [✓] No [ ] N/A [ ] Comments:
Check items received.

☑ *Name of Laboratory* ☑ *Address* ☑ *Project ID* ☑ *Phone #* ☑ *Sample identification – Field and Laboratory*
Client Information: ☑ *Name* ☑ *Address* ☑ *Client Contact* *(IDs must be cross-referenced)*

ACTION: If no, contact lab for submission of missing or illegible information.

1.2 Laboratory Report Certification Statement ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

Does the laboratory report include a completed Analytical Report Certification in the required format?

***ACTION**: If no, contact lab for submission of missing certification or certification with correct format.*

1.3 Laboratory Case Narrative: ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

☑ *Narrative serves as an exception report for the project and method QA/QC performance.* ☐ *Narrative includes an explanation of each discrepancy on the*

Certification Statement.

***ACTION**: If no, contact lab for submission of missing or illegible information.*

1.4 Chain of Custody (COC) copy present with all documentation completed **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: Olin receives and maintains the *original COC.*

ACTION: If no, contact lab for submission of copy of completed *COC.*

1.5 Sample Receipt Information (*Cooler Receipt Form present?*): **Yes** [✓] No [ ] N/A [ ] Comments:

Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

☑ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).

☑ Container type noted ☑ sample condition observed ☑ pH verified (where applicable) ☑ Field and lab IDs cross referenced

ACTION: If no, contact lab for submission of missing or incomplete documentation.

1.5.1 Were all samples delivered to the laboratory without breakage? **Yes** [✓] No [ ] N/A [ ] Comments:

1.5.2 Does the *Cooler Receipt Form* or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? Yes [ ] **No** [✓] N/A [ ] Comments:

1.6 Sample Results Section: *Was each of the following requirements supplied in the laboratory report for each sample?* **Yes** [✓] No [ ] N/A [ ] Comments:

☑ Field ID and Lab ID ☑ *Date and time collected* ☑ Analyst Initials ☑ *Dilution Factor* ☑ % moisture or solids ☑ *Reporting limits*
☑ *Clean-up method* ☑ Analysis method ☑ *Preparation method* ☑ *Date of preparation/extraction/digestion clean-up and analysis, where applicable*
☑ Matrix ☑ Target analytes and concentrations ☑ Units (soils must be reported in dry weight)

ACTION: If no, contact lab for submission of missing or incomplete information.

1.7 QA/QC Information: Was each of the following information supplied in the laboratory report for each sample batch? **Yes** [✓] No [ ] N/A [ ] Comments:

☑ Method blank results ☑ LCS recoveries ☑ MS/MSD recoveries and RPDs ☐ Laboratory duplicate results (where applicable)

ACTION: If no, contact lab for submission of missing or incomplete information.

2.0 Holding Times

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? Holding time for metals is 180 days from sample collection to analysis for both water and soil. Yes [ ] **No** [✓] N/A [ ] Comments:

NOTE: List samples that exceed hold time with # of days exceeded on checklist

ACTION: If technical holding times are exceeded, qualify all positive results (J) and non-detects (UJ). If grossly exceeded (2X holding time) reject (R) all non-detect results.

3.0 Laboratory Method

3.1 Was the correct laboratory method used? **Yes** [✓] No [ ] N/A [ ] Comments:

Water Digestion	3005A or 3010A or 3020A
Soil Digestion	3050B
Metals	6010B or 200.7

ACTION: If no, contact laboratory to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change and to request variance.

3.2 Are the practical quantitation limits the same as those specified by the ☐ SOW ☑ QAPP ☐ Lab ☐ MADEP **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *Verify that the reported metals match the target list specified on the COC.*

ACTION: If no, evaluate variation with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.

3.3 Are results present for each sample in the SDG? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, check Request for Analysis to verify if method was ordered and COC to verify that it was sent, and contact lab for resubmission of the missing data

3.4 If dilutions were required, were dilution factors reported? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact the lab for submission.

4.0 Method Blanks

4.1 Is the Method Blank Summary present? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, call the laboratory for submission of missing data.

4.2 Frequency of Analysis: Was a method blank analyzed for each digestion batch of < 20 field samples? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact laboratory for justification. Consult senior chemist for action needed. Narrate non-compliance.

4.3 Is the method blank less than the PQLs for all target elements? **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *MADEP requires the method blank to be matrix matched and digested with the samples*

4.4 Do any method blanks have positive results for metals? Qualify data according to the following: Yes [ ] **No** [✓] N/A [ ] Comments:

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

ACTION: For any blank with positive results, list all contaminants for each method blank including the concentration detected and the flagging level (flagging level = 5x the blank value) and the associated samples and qualifiers.

5.0 Laboratory Control Standard

5.1 Was a laboratory control standard run with each analytical batch of 20 samples or less?

Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *A full target, second source LCS is required by MADEP.*
ACTION: Call laboratory for LCS form submittal. If data are not available, use professional judgement to evaluate data accuracy associated with that batch.

5.2 Is a LCS Summary Form present?

Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.3 Is the recovery of any analyte outside of MADEP control limits?

Yes [ ] **No** [✓] N/A [ ] Comments:

Sample Type	*MADEP* *% Rec*
Water	*80-120*
Soil	within Lab generated limits

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and non-detects results within the batch as (J). If LCS recovery is <30%, positive and non-detect results are rejected (R).

Comments:

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs collected? List project samples that were spiked.

Yes [✓] No [ ] N/A [ ] Comments: OC-GW-2015

ACTION: If no, contact senior chemist to see if any were specified.

6.2 Is the Matrix Spike/Matrix Spike Duplicate Recovery Form present?

Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *A full target, second source MS/MSD is required by MADEP.*
ACTION: If any matrix spike data are missing, call lab for resubmission.

6.3 Were matrix spikes analyzed as indicated on the COC and project schedule?

Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If any matrix spike data are missing, call lab for resubmission. If none, no qualification is needed. Narrate non-compliance.

6.4 Are any metal spike recoveries outside of the QC limits?

Yes [ ] **No** [✓] N/A [ ] Comments:

Sample Type	***MADEP % Rec***	QAPP % Rec	Method
Water	*75-125*	N/A	6010B
Water	*N/A*	70-130	200.7
Soil	*75-125*	75-125	6010B

NOTE: $\%R = \frac{(SSR-SR)}{SA} \times 100\%$ Where: SSR = Spiked sample result, SR = Sample result, SA = Spike added

NOTE: If dilutions are required due to high sample concentrations (> 4X spike), the data are evaluated, but no flags are applied.

NOTE: If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.

ACTION: MS/MSD flags only apply to the sample spiked. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit, qualify positive results and non-detects (J).

6.5 Are any RPDs for MS/MSD recoveries outside of the QC limits? Yes [ ] **No [✓]** N/A [ ] Comments:

NOTE: $RPD = \frac{S-D}{(S+D)/2} \times 100\%$ Where: S = MS sample result, D = MSD sample result

NOTE: If dilutions are required due to high sample concentrations, the data are evaluated, but no flags are applied.

ACTION: If the RPD exceeds the control limit, qualify positive results and non-detects (J).

7.0 Laboratory Duplicate

7.1 Was a laboratory duplicate sample analyzed? If so, is the Laboratory Duplicate Sample Form present? **Yes [ ]** No [✓] N/A [ ] Comments:

NOTE: *MADEP refers to this sample as a "matrix duplicate".*

ACTION: If not analyzed, qualification is not needed. If data is missing, contact laboratory for resubmission of report. Narrate non-compliance.

7.2 Is the RPD between the result for the laboratory duplicate sample and the result for the parent sample outside of the QA/QC limits? Yes [ ] **No [ ]** N/A [✓] Comments:

MADEP Laboratory Duplicate Sample RPD Criteria:	QAPP RPD
For aqueous results > 5× RL, RPD must be ± 20%	20
For aqueous results < 5× RL, RPD must be ≤ RL	20
For soil/sediment results > 5× RL, RPD must be ± 35%	20
For soil/sediment results < 5× RL, RPD must be ≤ 2× RL	20

ACTION: If the RPD exceeds the limits, qualify both positive results and non-detects as estimated and flag them J. Narrate non-compliance

8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist.

Yes [ ] No [✓] N/A [ ] Comments:

8.2 Do any rinsate blanks have positive results?

Yes [ ] **No [ ]** N/A [✓] Comments:

***NOTE**: MADEP does not require the collection of rinsate blanks.*

ACTION: Evaluate rinsate results against blank results to determine if contaminant may be laboratory-derived. If results are not lab-related, qualify according to below.

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates.

Yes [✓] **No [ ]** N/A [ ] Comments: OC-GW-2015

9.2 Were field duplicates collected per the required frequency? **Yes** [✓] No [ ] N/A [ ] Comments:

SOW ☐ QAPP *(1 per 10)* ☑ *MADEP Option 1 (1 per 20)* ☐ *MADEP Option 3 (1 per 10)* ☐

9.3 Was the RPD ≤ 50% for soils or waters? Calculate the RPD for all results and attach to this review. **Yes** [✓] No [ ] N/A [ ] Comments:

OC-GW-2015	ORIG.	DUP	RPD
aluminum	100U	100U	0
chromium	16	16	0

ACTION: RPD must be ≤50% for soil and water. Qualify data (J) for both sample results if the RPD exceeds 50%.

10.0 Special QA/QC

10.1 Were both total and dissolved metals analysis performed? If so, the dissolved metal concentration should not exceed that of the total metal. Yes [ ] **No** [✓] N/A [ ] Comments:

ACTION: If results for both total and dissolved are ≥ 5x the PQL **and** the dissolved concentration is 10% higher than the total, flag both results as estimated (J). If total and dissolved concentrations are less than 5x the PQL **and** the **difference** exceeds 2x the PQL, flag both results as estimated (J)

10.0 Application of Validation Qualifiers

Was any of the data qualified?

Yes [ ] **No [✓]** N/A [ ] Comments:

If so, apply data qualifiers directly to the DQE copy of laboratory report and **flag pages** for entry in database.

REFERENCES

LAW, 1999, "Final Quality Assurance Project Plan, Olin Wilmington Property, 51 Eames Street, Wilmington, MA", LAW Engineering and Environmental Services, Kennesaw, GA 30144. August 1999

U.S. Environmental Protection Agency (USEPA), 1989. "Region 1 Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses"; Hazardous Site Evaluation Division; February 1989.

MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Compendium of Quality Control Requirements and Performance Standards for Selected Analytical Protocols ," WSC-CAM #10-320, Final, Revision No. 1, 1 July 2010.

MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data in Support of Action Conducted Under the Massachusetts Contingency Plan (MCP)," WSC-CAM, Section VIIA, Final, Revision No. 1, 1 July 2010.

MADEP, 2010. "Quality Control Requirements and Performance Standards for the Analysis of Trace Metals by Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES) in Support of Response Actions under the Massachusetts Contingency Plan (MCP)" WSC-CAM, Final, Revision No. 1, 5 July 2010.

OLIN-WILMINGTON
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
WET CHEMISTRY PARAMETERS BY VARIOUS METHODS

Reviewer/Date 12/7/11
Sr. Review/Date 1/4/12
Lab Report # 360-37526-1
Project # 6107 110016.12

specific conductance, chloride, sulfate, ammonia

Note: The following analyses will be evaluated according to the "MADEP QA/QC Guidelines for **Sampling, Data Evaluation and Reporting Activities.**" MADEP, however, may not list QA/QC criteria for every chemical analysis. Where not defined by MADEP, criteria will default to values stipulated in the QAPP. Where the QAPP does not define criteria, QA/QC requirements will default to limits employed by the laboratory.

1.0 Laboratory Deliverable Requirements

1.1 Laboratory Information: Was all of the following provided in the laboratory report? **Yes** [✓] No [ ] N/A [ ] Comments:
Check items received.

☑ *Name of Laboratory* ☑ *Address* ☑ *Project ID* ☐ *Phone #* ☑ *Sample identification – Field and Laboratory*

Client Information: ☑ *Name* ☑ *Address* ☐ *Client Contact* *(IDs must be cross-referenced)*

ACTION: If no, contact lab for submission of missing or illegible information.

1.2 Laboratory Report Certification Statement

Yes [✓] *No* [ ] *N/A* [ ] *Comments:*

Does the laboratory report include a completed Analytical Report Certification in the required format?

***ACTION**: If no, contact lab for submission of missing certification or certification with correct format.*

1.3 Laboratory Case Narrative:

Yes [✓] *No* [ ] *N/A* [ ] *Comments:*

☑ *Narrative serves as an exception report for the project and method QA/QC performance.* ☐ *Narrative includes an explanation of each discrepancy on the Certification Statement.*

***ACTION**: If no, contact lab for submission of missing or illegible information.*

1.4 Chain of Custody (COC) copy present with all documentation completed? **Yes** [✓] No [ ] N/A [ ] Comments:

Does the laboratory report include copies of Chain of Custody forms containing all samples in this SDG?

NOTE: Olin receives and maintains the *original* COC.

ACTION: If no, contact lab for submission of copy of missing completed COC.

1.5 Sample Receipt Information (*Cooler Receipt Form*): Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

Yes [✓] No [ ] N/A [ ] Comments:

☑ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).

☐ Container type noted ☑ Condition observed ☑ pH verified (where applicable) ☑ Field and lab IDs cross referenced

ACTION: If no, contact lab for submission of missing or incomplete documentation.

1.5.1 Were the correct bottles and preservatives used?

Yes [✓] No [ ] N/A [ ] Comments:

✓ Ammonia,– 1 Liter polyethylene/H_2SO_4 to pH<2,cool to 4°C

Oil & Grease – 1 Liter glass/HCL or H2SO4 to pH<2,cool to 4°C

Alkalinity – 1 Liter polyethylene/cool to 4°C

Chemical Oxygen Demand – 50 mL polyethylene/H_2SO_4 to pH<2,cool to 4°C

✓ Chloride, pH, sulfate, nitrate, nitrite - 50 mL polyethylene/cool to 4°C

Nitrate/nitrite - H2SO4 to pH<2,cool to 4°C

Organic Carbon – 500 mL amber glass bottle/HCl or H_2SO_4 to pH<2,cool to 4°C

Sulfide – 50 mL polyethylene/ZnAcetate + NaOH to pH>9, cool to 4°C

Phenolics - H_2SO_4 to pH<2,cool to 4°C

✓ Specific conductance, TDS, TSS – 100 mL polyethylene/cool to 4°C

ACTION: If no, inform senior chemist. Document justification for change in container/volume (if applicable), qualify positive and non-detect data (J) data if cooler temperature exceeds 10°C. Rejection of data requires professional judgment

1.5.2 Were all samples delivered to the laboratory without breakage?

Yes [✓] No [ ] N/A [ ] Comments:

1.5.3 Does the *Cooler Receipt Form* or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data?

Yes [ ] **No [✓]** N/A [ ] Comments:

1.6 Sample Results Section: *Was the following information supplied in the laboratory report for each sample?* **Yes** [✓] No [ ] N/A [ ] Comments:

- [✓] Field ID and Lab ID
- [ ] *Clean-up method*
- [✓] Matrix
- [✓] Date and time collected
- [✓] Analysis method
- [✓] Target analytes and concentrations
- [✓] Analyst Initials
- [✓] Preparation method
- [✓] Dilution Factor
- [✓] % moisture or solids
- [✓] Date of preparation/extraction/digestion clean-up and analysis, where applicable
- [✓] Units (soils must be reported in dry weight)
- [✓] Reporting limits

ACTION: If no, contact lab for submission of missing or incomplete information.

1.7 QA/QC Information: Was the following information provided in the laboratory report for each sample batch? **Yes** [✓] No [ ] N/A [ ] Comments:

- [✓] Method blank results
- [✓] LCS recoveries
- [✓] MS/MSD recoveries and RPDs
- [✓] Laboratory duplicate results (where applicable)

ACTION: If no, contact lab for submission of missing or incomplete information.

2.0 Holding Times Yes [ ] **No** [✓] N/A [ ] Comments:

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? The holding times are as follows:

28 days = ammonia, chemical oxygen demand, chloride, organic carbon, oil & grease, specific conductance, total organic carbon and sulfate

Alkalinity = 14 days | Sulfide, TDS, TSS = 7 days | pH = analyze immediately | Nitrate nitrogen as N = 48 hrs

Nitrite nitrogen as N = 48 hrs | Nitrate + Nitrite as N = 28 days

NOTE: List samples that exceed hold time with # of days exceeded on checklist

ACTION: If technical holding times are exceeded qualify results (J). For water samples that are grossly exceeded (>2X hold time) reject (R) all non-detect results. Professional judgment used to qualify soils.

3.0 Laboratory Method **Yes** [✓] No [ ] N/A [ ] Comments:

3.1 Was the correct laboratory method used?

ACTION: If no, contact lab to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change or to request variance.

3.2 Are the practical quantitation limits the same as those specified by the ☑ QAPP/IRSWP ☐ Lab? **Yes** [✓] No [ ] N/A [ ] Comments:

Note: *The MADEP QA/QC Guidelines do not yet list PQLs for wet chemistry analyses, therefore all criteria will default to values stipulated in the QAPP*. Where the QAPP does not define criteria, QA/QC requirements default to limits employed by the lab**. Other criteria may also apply.*

Ammonia* ☑ = 0.1 mg/ L	Alkalinity** ☐ = 1 mg/L	Bicarbonate Alkalinity** ☐ = 1 mg/L	Carbonate Alkalinity** ☐ = 1 mg/L
Nitrate Nitrogen as N* ☐ = .05 mg/L	Nitrite Nitrogen as N* ☐ = .01 mg/L	Chloride* ☑ = 1 mg/L	Hardness * ☐ = 2 mg/L
Spec. Cond.** ☑ 3 umhos/cm	Total Organic Carbon** ☐ = 1 mg/L	Oil & Grease* ☐ = 5.5 mg/L	Sulfate (EPA 300.0)* ☑ = 2 mg/L
COD:* Low – 20 mg/L	COD* High - 50 mg/L ☐	TDS* ☐ = 10 mg/L	TSS* ☐ = 5 mg/L
pH* ☐ < 2 to > 12	Phenolic - 0.01 mg/L		

Other parameter(list) _____ PQL = _____ ☐ Source of PQL = _____

Other parameter(list) _____ PQL = _____ ☐ Source of PQL = _____

ACTION: If no, evaluate change with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.

3.3 Are the appropriate parameter results present for each sample in the SDG? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, check Request for Analysis to verify if method was ordered and COC to verify that it was sent, and contact lab for resubmission of the missing data

3.4 If *dilutions were required, were dilution factors reported?* **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact the lab for submission.

4.0 <u>Method Blanks</u> **Yes** [✓] No [ ] N/A [ ] Comments:

4.1 Are the Method Blank Summaries present?

ACTION: If no, call the laboratory for submission of missing data.

4.2 Was a method blank analyzed for each analysis batch of wet chemistry field samples of 20 or less? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, document discrepancy in case narrative and contact lab for justification. Consult senior chemist for action needed.

4.3 Is the method blank less than the PQL? (See Section 3.2 for PQLs). **Yes** [✓] No [ ] N/A [ ] Comments:

4.4 Do any method blanks have positive results for wet chemistry parameters? Qualify data according to the following: Yes [ ] **No** [✓] N/A [ ] Comments:

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

ACTION: If any blank has positive results, list all the concentrations detected and flagging level (flagging level = 5 × blank value) on the checklist. List all affected samples and their qualifiers.

5.0 Laboratory Control Standards

5.1 Was a laboratory control standard (LCS) run with each analytical batch of 20 samples or less? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, call laboratory for LCS form submittal. If data is not available, use professional judgment to determine qualification actions for data associated with the batch.

5.2 Is a LCS Summary Form present? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.3 Is any wet chemistry analyte LCS recovery outside the control limits? Yes [ ] **No** [✓] N/A [ ] Comments:

LCS Limits:

Alkalinity** ☐ = 80-120%	Bicarbonate Alkalinity** ☐ = 80-120%	Carbonate Alkalinity** ☐ = 80-120%	Specific Conductivity *☑ = 80-120%
Total Organic Carbon** ☐ = 80-120%	TDS** ☐ = 80-120%	Oil & Grease* ☐ = 80-120%	Ammonia Nitrogen as N* ☑ = 80-120%
COD Low* ☐ = 80-120%	COD High* ☐ = 80-120%	Nitrate Nitrogen as N**☐ = 80-120%	Nitrite Nitrogen as N** ☐= 80-120%
Hardness* ☐ = 80-120%	Chloride* ☑ = 80-120%	Sulfate (EPA 300.0)* ☑ = 80-120%	pH* ☐ = 98-102% TSS* NA

Other parameter(list) _____ %R = _____ ☐ Rec Limits= _____

Other parameter(list) _____ %R = _____ ☐ Rec Limits = _____

(MADEP has not yet defined LCS recovery limits for wet chemistry analyses.)

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and no-detect results within the batch as (J). If LCS recovery is <10%, non-detect results are rejected (R).

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs analyzed? List project samples that were spiked.

ACTION: If no, contact senior chemist to see if any were specified.

Yes [✓] No [ ] N/A [ ] Comments: OC-GW-2015

6.2 Is the MS/MSD Recovery Form present?

ACTION: If no, contact lab for resubmission of missing data.

Yes [✓] No [ ] N/A [ ] Comments:

6.3 Were matrix spikes analyzed at the required frequency of 1 per 20 samples per matrix?

Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If any matrix spike data is missing, call lab for resubmission.

The MS for ammonia (134) in sample OC-GW-2015 exceeded the upper QC limit of 125.
The unspiked ammonia result is greater than four times the spiking concentration. Yes [✓] **No** [ ] N/A [ ] Comments:
No qualification required.

The MSD for sulfate (47) was less than the lower QC limit of 75; no qualification was required.

Method: 300.0 - Chloride & Sulfate (Continued)

Lab Sample ID: MB 360-83987/5
Matrix: Water
Analysis Batch: 83987

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	ND		2.0	2.0	mg/L			11/24/11 09:00	1
Chloride	ND		1.0	1.0	mg/L			11/24/11 09:00	1

Lab Sample ID: LCS 360-83987/6
Matrix: Water
Analysis Batch: 83987

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	80.0	86.5		mg/L		108	85 - 115
Chloride	40.0	43.9		mg/L		110	85 - 115

Lab Sample ID: MB 360-84080/3
Matrix: Water
Analysis Batch: 84080

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	ND		2.0	2.0	mg/L			11/28/11 20:17	1
Chloride	ND		1.0	1.0	mg/L			11/28/11 20:17	1

Lab Sample ID: LCS 360-84080/4
Matrix: Water
Analysis Batch: 84080

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	80.0	77.4		mg/L		97	85 - 115
Chloride	40.0	39.8		mg/L		99	85 - 115

Lab Sample ID: 360-37526-3 MS
Matrix: Water
Analysis Batch: 84080

Client Sample ID: OC-GW-201S
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	1400		400	1770		mg/L		92	75 - 125

Lab Sample ID: 360-37526-3 MSD
Matrix: Water
Analysis Batch: 84080

Client Sample ID: OC-GW-201S
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Sulfate	1400		400	1590	F	mg/L		47	75 - 125	11	20

Lab Sample ID: MB 360-84209/5
Matrix: Water
Analysis Batch: 84209

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	ND		2.0	2.0	mg/L			12/01/11 16:00	1
Chloride	ND		1.0	1.0	mg/L			12/01/11 16:00	1

Method: 300.0 - Chloride & Sulfate (Continued)

Lab Sample ID: LCS 360-84209/6
Matrix: Water
Analysis Batch: 84209

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	80.0	78.5		mg/L		98	85 - 115
Chloride	40.0	41.4		mg/L		103	85 - 115

Method: L107-06-1B - Nitrogen Ammonia

Lab Sample ID: MB 360-83754/1-A
Matrix: Water
Analysis Batch: 83912

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 83754

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	ND		0.10	0.10	mg/L		11/22/11 11:45	11/23/11 14:05	1

Lab Sample ID: LCS 360-83754/2-A
Matrix: Water
Analysis Batch: 83912

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 83754

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Ammonia	10.0	9.28		mg/L		93	90 - 110

Lab Sample ID: 360-37526-3 MS
Matrix: Water
Analysis Batch: 83912

Client Sample ID: OC-GW-201S
Prep Type: Total/NA
Prep Batch: 83754

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Ammonia	180		10.0	192	4	mg/L		134	90 - 110

Lab Sample ID: 360-37526-3 MSD
Matrix: Water
Analysis Batch: 83912

Client Sample ID: OC-GW-201S
Prep Type: Total/NA
Prep Batch: 83754

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Ammonia	180		10.0	188	4	mg/L		97	90 - 110	2	20

Lab Sample ID: MB 360-83810/1-A
Matrix: Water
Analysis Batch: 83913

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 83810

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	ND		0.10	0.10	mg/L		11/23/11 09:19	11/23/11 14:25	1

Lab Sample ID: LCS 360-83810/2-A
Matrix: Water
Analysis Batch: 83913

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 83810

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Ammonia	10.0	10.4		mg/L		104	90 - 110

Method: L107-06-1B - Nitrogen Ammonia (Continued)

Lab Sample ID: 360-37526-8 MS
Matrix: Water
Analysis Batch: 83913

Client Sample ID: OC-PZ-18R
Prep Type: Total/NA
Prep Batch: 83810

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Ammonia	62		10.0	71.2	4	mg/L		93	90 - 110

Lab Sample ID: 360-37526-8 MSD
Matrix: Water
Analysis Batch: 83913

Client Sample ID: OC-PZ-18R
Prep Type: Total/NA
Prep Batch: 83810

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Ammonia	62		10.0	74.0	4	mg/L		121	90 - 110	4	20

Method: SM 2510B - Conductivity, Specific Conductance

Lab Sample ID: MB 360-83283/3
Matrix: Water
Analysis Batch: 83283

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	ND		1.0	1.0	umhos/cm			11/12/11 09:43	1

Lab Sample ID: LCS 360-83283/1
Matrix: Water
Analysis Batch: 83283

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Specific Conductance	1410	1410		umhos/cm		100	85 - 115

Lab Sample ID: MB 360-83626/3
Matrix: Water
Analysis Batch: 83626

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	ND		1.0	1.0	umhos/cm			11/19/11 08:19	1

Lab Sample ID: LCS 360-83626/1
Matrix: Water
Analysis Batch: 83626

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Specific Conductance	1410	1400		umhos/cm		99	85 - 115

Lab Sample ID: 360-37526-3 DU
Matrix: Water
Analysis Batch: 83626

Client Sample ID: OC-GW-201S
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Specific Conductance	3100		3120		umhos/cm		0.3	20

6.4 Are any wet chemistry analyte spike recoveries outside of the QC limits?

NOTE: $\%R = \frac{(SSR-SR)}{SA} \times 100\%$ Where: SSR = Spiked sample result
SR = Sample result
SA = Spike added

MS/MSD Recovery Limits:

Alkalinity* = NA	Bicarbonate Alkalinity* = NA	Carbonate alkalinity* = NA	Ammonia* (LACHAT) ☒ = 75-125%
Chloride*(SM 4500 Cl) ☑ = 75-125%	Specific Conductivity * = NA	Total Organic Carbon* = NA	TDS** = NA
Oil & Grease* = NA	COD Low* ☐ = 75-125%	COD High* ☐ = 75-125%	Nitrate Nitrogen as N** ☐ = 75-125%
Nitrite Nitrogen as N** ☐ = 75-125%	Hardness* ☐ = 75-125%	Sulfate (EPA 300.0)* ☒ = 75-125%	pH* = NA TSS* = NA

Other parameter(list) _____ % R = _____ ☐ Rec Limits = _____

* = Laboratory Limits ** = Olin QAPP Limits (*MADEP has not yet defined LCS recovery limits for wet chemistry analyses.*)

NOTES: 1) If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.
2) If the MS/MSD was performed by the laboratory on a non-project sample, no qualification is required.

ACTION: MS/MSD flags only apply to the sample spiked. Do not evaluate if sample concentration is > 4X spike. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit but > 30%, qualify both positive results and non-detects (J). If the MS/MSD recovery is < 30% and the sample is non-detect, the results are considered unusable and flagged (R).

ACTION: Laboratory control limits apply when spiked sample results fall within the normal calibration range. If dilutions are required due to high sample concentrations, the data is evaluated, but no flags are applied.

6.5 Are any RPDs for MS/MSD recoveries outside of the QA/QC limits?

NOTE: $RPD = \frac{S-D}{(S+D)/2} \times 100\%$ Where S = MS result
D = MSD result

Yes [ ] **No** [✓] N/A [ ] Comments:

MS/MSD RPD Limits:

RPD ≤ 20

7.0 Laboratory Duplicate

Are the RPDs for the laboratory duplicates <20% unless otherwise specified below?

Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If the RPD is greater than specified limits, qualify all results for that analyte as estimated (J).

pH* ☐ = 3% Specific Conductivity *☑ = 5% TSS** ☐ = 6% TDS** ☐ = 6%

8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist. **Yes** [ ] No [✓] N/A [ ] Comments:

8.2 Do any rinsate blanks have positive results? Yes [ ] **No** [ ] N/A [✓] Comments:

ACTION: Evaluate rinsate results vs. blank results to determine if contaminant may be laboratory-derived. If not lab-related, qualify according to the table below.

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

NOTE: *MADEP does not require the collection of rinsate blanks.*

9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates. **Yes** [✓] No [ ] N/A [ ] Comments: OC-GW-2015

9.2 Were field duplicates collected per the required frequency? **Yes** [✓] No [ ] N/A [ ] Comments:

QAPP/IRSWP ☑ *MADEP Option 1(1 per 20)* ☐ *MADEP Option 3 (1 per 10)* ☐

9.3 Was the RPD ≤ 30% for waters ≤ 50% for soils? Calculate the RPD for results and attach to this review. **Yes** [✓] No [ ] N/A [ ] Comments: See attached.

VALIDATION REPORT
360-37526-1 WET CHEM
FIELD DUPLICATE RPD ASSESSMENT
NOVEMBER 2011
OLIN SLURRY WALL CAP

Sample ID	Analyte	Orig	Q	DUP	Q	RPD
OC-GW-201S	Chloride	77		81		5.1
OC-GW-201S	LAB SPECIFIC CONDUCTANCE	3100		3100		0
OC-GW-201S	Nitrogen, as Ammonia	180		150		18
OC-GW-201S	Sulfate	1400		1300		7.4

12/7/11

ACTION:. Qualify data (J) for both sample results if the RPD exceeded.

Was any of the data qualified?

Yes [ ] **No** [✓] N/A [ ] Comments:

If so, apply data qualifiers directly to the DQE copy of laboratory report and **flag pages** for entry in database.

REFERENCES:-

MACTEC, 2007. "Draft Interim Response Steps Work Plan"; Olin Chemical Superfund Site, 51 Eames Street, Wilmington, Massachusetts.; Project No. 6300-06-0010/41.1; July 25, 2007.

MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Compendium of Quality Control Requirements and Performance Standards for Selected Analytical Protocols ," WSC-CAM #10-320, Final, Revision No. 1, 5 July 2010.

MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data in Support of Action Conducted Under the Massachusetts Contingency Plan (MCP)," WSC-CAM, Section VIIA, Final, Revision No. 1, 1 July 2010.

OLIN-WILMINGTON
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
ICP METALS BY METHOD 6010B/200.7

Reviewer/Date [signature] 12/7/11
Sr. Review/Date Chris Ricardi 1/4/12
Lab Report # 360-37552-1
Project # 0107110016.12

dissolved aluminum, chromium.

1.0 Laboratory Deliverable Requirements

1.1 Laboratory Information: Was all of the following provided in the laboratory report? **Yes** [✓] No [ ] N/A [ ] Comments:
Check items received.

☑ *Name of Laboratory* ☑ *Address* ☑ *Project ID* ☑ *Phone #* ☑ *Sample identification – Field and Laboratory*
Client Information: ☐ *Name* ☑ *Address* ☐ *Client Contact* *(IDs must be cross-referenced)*

ACTION: If no, contact lab for submission of missing or illegible information.

1.2 Laboratory Report Certification Statement

Yes [✓] *No* [ ] *N/A* [ ] *Comments:*

Does the laboratory report include a completed Analytical Report Certification in the required format?

***ACTION**: If no, contact lab for submission of missing certification or certification with correct format.*

1.3 Laboratory Case Narrative:

Yes [✓] *No* [ ] *N/A* [ ] *Comments:*

☑ *Narrative serves as an exception report for the project and method QA/QC performance.* ☐ *Narrative includes an explanation of each discrepancy on the*

Certification Statement.

***ACTION**: If no, contact lab for submission of missing or illegible information.*

1.4 Chain of Custody (COC) copy present with all documentation completed **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: Olin receives and maintains the *original COC.*

ACTION: If no, contact lab for submission of copy of completed *COC.*

1.5 Sample Receipt Information (*Cooler Receipt Form present?*): Yes [✓] No [ ] N/A [ ] Comments:

Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

☑ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).

☑ Container type noted ☑ sample condition observed ☑ pH verified (where applicable) ☑ Field and lab IDs cross referenced

ACTION: If no, contact lab for submission of missing or incomplete documentation.

1.5.1 Were all samples delivered to the laboratory without breakage? Yes [✓] No [ ] N/A [ ] Comments:

1.5.2 Does the *Cooler Receipt Form* or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? Yes [ ] **No** [✓] N/A [ ] Comments:

1.6 Sample Results Section: *Was each of the following requirements supplied in the laboratory report for each sample?* Yes [✓] No [ ] N/A [ ] Comments:

☑ Field ID and Lab ID ☑ *Date and time collected* ☑ Analyst Initials ☑ *Dilution Factor* ☑ % moisture or solids ☑ *Reporting limits*
☑ *Clean-up method* ☑ Analysis method ☑ *Preparation method* ☑ *Date of preparation/extraction/digestion clean-up and analysis, where applicable*
☑ Matrix ☑ Target analytes and concentrations ☑ Units (soils must be reported in dry weight)

ACTION: If no, contact lab for submission of missing or incomplete information.

1.7 QA/QC Information: Was each of the following information supplied in the laboratory report for each sample batch? Yes [✓] No [ ] N/A [ ] Comments:

☑ Method blank results ☑ LCS recoveries ☑ MS/MSD recoveries and RPDs ☑ Laboratory duplicate results (where applicable)

ACTION: If no, contact lab for submission of missing or incomplete information.

2.0 Holding Times

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? Holding time for metals is 180 days from sample collection to analysis for both water and soil. Yes [ ] **No [✓]** N/A [ ] Comments:

NOTE: List samples that exceed hold time with # of days exceeded on checklist

ACTION: If technical holding times are exceeded, qualify all positive results (J) and non-detects (UJ). If grossly exceeded (2X holding time) reject (R) all non-detect results.

3.0 Laboratory Method

3.1 Was the correct laboratory method used? **Yes [✓]** No [ ] N/A [ ] Comments:

Water Digestion	3005A or 3010A or 3020A
Soil Digestion	3050B
Metals	6010B or 200.7

ACTION: If no, contact laboratory to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change and to request variance.

3.2 Are the practical quantitation limits the same as those specified by the ☐ SOW ☑ QAPP ☐ Lab ☐ MADEP **Yes [✓]** No [ ] N/A [ ] Comments:

NOTE: *Verify that the reported metals match the target list specified on the COC.*

ACTION: If no, evaluate variation with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.

3.3 Are results present for each sample in the SDG? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, check Request for Analysis to verify if method was ordered and COC to verify that it was sent, and contact lab for resubmission of the missing data

3.4 If dilutions were required, were dilution factors reported? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact the lab for submission.

4.0 Method Blanks

4.1 Is the Method Blank Summary present? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, call the laboratory for submission of missing data.

4.2 Frequency of Analysis: Was a method blank analyzed for each digestion batch of < 20 field samples? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact laboratory for justification. Consult senior chemist for action needed. Narrate non-compliance.

4.3 Is the method blank less than the PQLs for all target elements? **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *MADEP requires the method blank to be matrix matched and digested with the samples*

4.4 Do any method blanks have positive results for metals? Qualify data according to the following: Yes [ ] **No** [✓] N/A [ ] Comments:

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

ACTION: For any blank with positive results, list all contaminants for each method blank including the concentration detected and the flagging level (flagging level = 5x the blank value) and the associated samples and qualifiers.

5.0 Laboratory Control Standard

5.1 Was a laboratory control standard run with each analytical batch of 20 samples or less?

Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *A full target, second source LCS is required by MADEP.*
ACTION: Call laboratory for LCS form submittal. If data are not available, use professional judgement to evaluate data accuracy associated with that batch.

5.2 Is a LCS Summary Form present?

Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.3 Is the recovery of any analyte outside of MADEP control limits?

Yes [ ] **No** [✓] N/A [ ] Comments:

Sample Type	*MADEP % Rec*
Water	*80-120*
Soil	within Lab generated limits

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and non-detects results within the batch as (J). If LCS recovery is <30%, positive and non-detect results are rejected (R).

Comments:

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs ~~collected?~~ analyzed? List project samples that were spiked. (D) 4/7/11

Yes [✓] No [ ] N/A [ ] Comments: OC-GW CA1

ACTION: If no, contact senior chemist to see if any were specified.

6.2 Is the Matrix Spike/Matrix Spike Duplicate Recovery Form present?

Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *A full target, second source MS/MSD is required by MADEP.*
ACTION: If any matrix spike data are missing, call lab for resubmission.

6.3 Were matrix spikes analyzed as indicated on the COC and project schedule?

Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If any matrix spike data are missing, call lab for resubmission. If none, no qualification is needed. Narrate non-compliance.

6.4 Are any metal spike recoveries outside of the QC limits?

Yes [ ] No [✓] N/A [ ] Comments:

Sample Type	***MADEP % Rec***	QAPP % Rec	Method
Water	*75-125*	N/A	6010B
Water	*N/A*	70-130	200.7
Soil	*75-125*	75-125	6010B

NOTE: $\%R = \frac{(SSR-SR)}{SA} \times 100\%$ Where: SSR = Spiked sample result, SR = Sample result, SA = Spike added

NOTE: If dilutions are required due to high sample concentrations (> 4X spike), the data are evaluated, but no flags are applied.

NOTE: If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.

ACTION: MS/MSD flags only apply to the sample spiked. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit, qualify positive results and non-detects (J).

6.5 Are any RPDs for MS/MSD recoveries outside of the QC limits? Yes [ ] **No** [✓] N/A [ ] Comments:

NOTE: $RPD = \frac{S-D}{(S+D)/2} \times 100\%$ Where: S = MS sample result, D = MSD sample result

NOTE: If dilutions are required due to high sample concentrations, the data are evaluated, but no flags are applied.

ACTION: If the RPD exceeds the control limit, qualify positive results and non-detects (J).

7.0 Laboratory Duplicate

7.1 Was a laboratory duplicate sample analyzed? If so, is the Laboratory Duplicate Sample Form present? **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *MADEP refers to this sample as a "matrix duplicate".*

ACTION: If not analyzed, qualification is not needed. If data is missing, contact laboratory for resubmission of report. Narrate non-compliance.

7.2 Is the RPD between the result for the laboratory duplicate sample and the result for the parent sample outside of the QA/QC limits? Yes [ ] **No** [✓] N/A [ ] Comments:

MADEP Laboratory Duplicate Sample RPD Criteria:	QAPP RPD
For aqueous results > 5× RL, RPD must be ± 20%	20
For aqueous results < 5× RL, RPD must be ≤ RL	20
For soil/sediment results > 5× RL, RPD must be ± 35%	20
For soil/sediment results < 5× RL, RPD must be ≤ 2× RL	20

ACTION: If the RPD exceeds the limits, qualify both positive results and non-detects as estimated and flag them J. Narrate non-compliance

8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist.

Yes [ ] No [✓] N/A [ ] Comments:

8.2 Do any rinsate blanks have positive results?

Yes [ ] **No** [ ] N/A [✓] Comments:

NOTE: *MADEP does not require the collection of rinsate blanks.*

ACTION: Evaluate rinsate results against blank results to determine if contaminant may be laboratory-derived. If results are not lab-related, qualify according to below.

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates.

Yes [ ] **No** [✓] N/A [ ] Comments:

9.2 Were field duplicates collected per the required frequency? **Yes** [__] No [__] N/A [✓] Comments:

SOW ☐ QAPP *(1 per 10)* ☐ *MADEP Option 1 (1 per 20)* ☐ *MADEP Option 3 (1 per 10)* ☐

9.3 Was the RPD ≤ 50% for soils or waters? Calculate the RPD for all results and attach to this review. **Yes** [__] No [__] N/A [✓] Comments:

ACTION: RPD must be ≤50% for soil and water. Qualify data (J) for both sample results if the RPD exceeds 50%.

10.0 Special QA/QC

10.1 Were both total and dissolved metals analysis performed? If so, the dissolved metal concentration should not exceed that of the total metal. Yes [__] **No** [✓] N/A [__] Comments:

ACTION: If results for both total and dissolved are ≥ 5x the PQL **and** the dissolved concentration is 10% higher than the total, flag both results as estimated (J). If total and dissolved concentrations are less than 5x the PQL **and** the **difference** exceeds 2x the PQL, flag both results as estimated (J)

10.0 Application of Validation Qualifiers

Was any of the data qualified?

Yes [ ] **No** [✓] N/A [ ] Comments:

If so, apply data qualifiers directly to the DQE copy of laboratory report and **flag pages** for entry in database.

REFERENCES

LAW, 1999, "Final Quality Assurance Project Plan, Olin Wilmington Property, 51 Eames Street, Wilmington, MA", LAW Engineering and Environmental Services, Kennesaw, GA 30144. August 1999

U.S. Environmental Protection Agency (USEPA), 1989. "Region 1 Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses"; Hazardous Site Evaluation Division; February 1989.

MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Compendium of Quality Control Requirements and Performance Standards for Selected Analytical Protocols ," WSC-CAM #10-320, Final, Revision No. 1, 1 July 2010.

MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data in Support of Action Conducted Under the Massachusetts Contingency Plan (MCP)," WSC-CAM, Section VIIA, Final, Revision No. 1, 1 July 2010.

MADEP, 2010. "Quality Control Requirements and Performance Standards for the Analysis of Trace Metals by Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES) in Support of Response Actions under the Massachusetts Contingency Plan (MCP)" WSC-CAM, Final, Revision No. 1, 5 July 2010.

OLIN-WILMINGTON
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
WET CHEMISTRY PARAMETERS BY VARIOUS METHODS

specific conductance, chloride, sulfate, ammonia

Reviewer/Date 12/2/11
Sr. Review/Date Chris Ricardi 1/4/12
Lab Report # 360-37552-1
Project # 6107110016.12

Note: The following analyses will be evaluated according to the "MADEP QA/QC Guidelines for **Sampling, Data Evaluation and Reporting Activities.**" MADEP, however, may not list QA/QC criteria for every chemical analysis. Where not defined by MADEP, criteria will default to values stipulated in the QAPP. Where the QAPP does not define criteria, QA/QC requirements will default to limits employed by the laboratory.

1.0 Laboratory Deliverable Requirements

1.1 Laboratory Information: Was all of the following provided in the laboratory report? **Yes** [✓] No [ ] N/A [ ] Comments:
Check items received.

☑ *Name of Laboratory* ☑ *Address* ☑ *Project ID* ☑ *Phone #* ☑ *Sample identification – Field and Laboratory*

Client Information: ☑ *Name* ☑ *Address* ☑ *Client Contact* *(IDs must be cross-referenced)*

ACTION: If no, contact lab for submission of missing or illegible information.

1.2 Laboratory Report Certification Statement

Yes [✓] *No* [ ] *N/A* [ ] *Comments:*

Does the laboratory report include a completed Analytical Report Certification in the required format?

***ACTION**: If no, contact lab for submission of missing certification or certification with correct format.*

1.3 Laboratory Case Narrative:

Yes [✓] *No* [ ] *N/A* [ ] *Comments:*

☑ *Narrative serves as an exception report for the project and method QA/QC performance.*

☐ *Narrative includes an explanation of each discrepancy on the Certification Statement.*

***ACTION**: If no, contact lab for submission of missing or illegible information.*

1.4 Chain of Custody (COC) copy present with all documentation completed? **Yes** [✓] No [ ] N/A [ ] Comments:

Does the laboratory report include copies of Chain of Custody forms containing all samples in this SDG?

NOTE: Olin receives and maintains the *original* COC.

ACTION: If no, contact lab for submission of copy of missing completed COC.

1.5 Sample Receipt Information (*Cooler Receipt Form*): Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

Yes [✓] No [ ] N/A [ ] Comments:

☑ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).

☑ Container type noted ☑ Condition observed ☑ pH verified (where applicable) ☑ Field and lab IDs cross referenced

ACTION: If no, contact lab for submission of missing or incomplete documentation.

1.5.1 Were the correct bottles and preservatives used? Yes [✓] No [ ] N/A [ ] Comments:

✓Ammonia,– 1 Liter polyethylene/H_2SO_4 to pH<2,cool to 4°C

Oil & Grease – 1 Liter glass/HCL or H2SO4 to pH<2,cool to 4°C

Alkalinity – 1 Liter polyethylene/cool to 4°C

Chemical Oxygen Demand – 50 mL polyethylene/H_2SO_4 to pH<2,cool to 4°C

✓Chloride, pH, ✓sulfate, nitrate, nitrite - 50 mL polyethylene/cool to 4°C

Nitrate/nitrite - H2SO4 to pH<2,cool to 4°C

Organic Carbon – 500 mL amber glass bottle/HCl or H_2SO_4 to pH<2,cool to 4°C

Sulfide – 50 mL polyethylene/ZnAcetate + NaOH to pH>9, cool to 4°C

Phenolics - H_2SO_4 to pH<2,cool to 4°C

✓Specific conductance, TDS, TSS – 100 mL polyethylene/cool to 4°C

ACTION: If no, inform senior chemist. Document justification for change in container/volume (if applicable), qualify positive and non-detect data (J) data if cooler temperature exceeds 10°C. Rejection of data requires professional judgment

1.5.2 Were all samples delivered to the laboratory without breakage? Yes [✓] No [ ] N/A [ ] Comments:

1.5.3 Does the *Cooler Receipt Form* or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? Yes [ ] **No [✓]** N/A [ ] Comments:

1.6 Sample Results Section: *Was the following information supplied in the laboratory report for each sample?*

Yes [✓] No [ ] N/A [ ] Comments:

- [✓] Field ID and Lab ID
- [✓] Date and time collected
- [✓] Analyst Initials
- [✓] Dilution Factor
- [N/A] % moisture or solids
- [✓] Reporting limits
- [✓] *Clean-up method*
- [✓] Analysis method
- [✓] Preparation method
- [✓] Date of preparation/extraction/digestion clean-up and analysis, where applicable
- [✓] Matrix
- [✓] Target analytes and concentrations
- [✓] Units (soils must be reported in dry weight)

ACTION: If no, contact lab for submission of missing or incomplete information.

1.7 QA/QC Information: Was the following information provided in the laboratory report for each sample batch? Yes [✓] No [ ] N/A [ ] Comments:

- [✓] Method blank results
- [✓] LCS recoveries
- [✓] MS/MSD recoveries and RPDs
- [✓] Laboratory duplicate results (where applicable)

ACTION: If no, contact lab for submission of missing or incomplete information.

2.0 Holding Times Yes [ ] No [✓] N/A [ ] Comments:

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? The holding times are as follows:

✓ 28 days = ammonia, chemical oxygen demand, chloride, organic carbon, oil & grease, specific conductance, total organic carbon and sulfate

Alkalinity = 14 days | Sulfide, TDS, TSS = 7 days | pH = analyze immediately | Nitrate nitrogen as N = 48 hrs

Nitrite nitrogen as N = 48 hrs | Nitrate + Nitrite as N = 28 days

NOTE: List samples that exceed hold time with # of days exceeded on checklist

ACTION: If technical holding times are exceeded qualify results (J). For water samples that are grossly exceeded (>2X hold time) reject (R) all non-detect results. Professional judgment used to qualify soils.

3.0 Laboratory Method Yes [✓] No [ ] N/A [ ] Comments:

3.1 Was the correct laboratory method used?

ACTION: If no, contact lab to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change or to request variance.

3.2 Are the practical quantitation limits the same as those specified by the ☐ QAPP/IRSWP ☐ Lab? **Yes** [✓] No [ ] N/A [ ] Comments:

Note: *The MADEP QA/QC Guidelines do not yet list PQLs for wet chemistry analyses, therefore all criteria will default to values stipulated in the QAPP*. Where the QAPP does not define criteria, QA/QC requirements default to limits employed by the lab**. Other criteria may also apply.*

Ammonia* ☑ = 0.1 mg/ L	Alkalinity** ☐ = 1 mg/L	Bicarbonate Alkalinity** ☐ = 1 mg/L	Carbonate Alkalinity** ☐ = 1 mg/L
Nitrate Nitrogen as N* ☐ = .05 mg/L	Nitrite Nitrogen as N* ☐ = .01 mg/L	Chloride* ☑ = 1 mg/L	Hardness * ☐ = 2 mg/L
Spec. Cond.** ☑ 3 umhos/cm	Total Organic Carbon** ☐ = 1 mg/L	Oil & Grease* ☐ = 5.5 mg/L	Sulfate (EPA 300.0)* ☑ = 2 mg/L
COD:* Low – 20 mg/L	COD* High - 50 mg/L ☐	TDS* ☐ = 10 mg/L	TSS* ☐ = 5 mg/L
pH* ☐ < 2 to > 12	Phenolic - 0.01 mg/L		

Other parameter(list) _____ PQL = _____ ☐ Source of PQL = _____

Other parameter(list) _____ PQL = _____ ☐ Source of PQL = _____

ACTION: If no, evaluate change with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.

3.3 Are the appropriate parameter results present for each sample in the SDG? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, check Request for Analysis to verify if method was ordered and COC to verify that it was sent, and contact lab for resubmission of the missing data

3.4 If *dilutions were required, were dilution factors reported?* **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact the lab for submission.

4.0 Method Blanks **Yes** [✓] No [ ] N/A [ ] Comments:

4.1 Are the Method Blank Summaries present?

ACTION: If no, call the laboratory for submission of missing data.

4.2 Was a method blank analyzed for each analysis batch of wet chemistry field samples of 20 or less? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, document discrepancy in case narrative and contact lab for justification. Consult senior chemist for action needed.

4.3 Is the method blank less than the PQL? (See Section 3.2 for PQLs). **Yes [✓]** No [ ] N/A [ ] Comments:

4.4 Do any method blanks have positive results for wet chemistry parameters? Qualify data according to the following: Yes [ ] **No [✓]** N/A [ ] Comments:

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

ACTION: If any blank has positive results, list all the concentrations detected and flagging level (flagging level = 5 × blank value) on the checklist. List all affected samples and their qualifiers.

5.0 Laboratory Control Standards

5.1 Was a laboratory control standard (LCS) run with each analytical batch of 20 samples or less? **Yes [✓]** No [ ] N/A [ ] Comments:

ACTION: If no, call laboratory for LCS form submittal. If data is not available, use professional judgment to determine qualification actions for data associated with the batch.

5.2 Is a LCS Summary Form present? **Yes [✓]** No [ ] N/A [ ] Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.3 Is any wet chemistry analyte LCS recovery outside the control limits? Yes [ ] **No [✓]** N/A [ ] Comments:

LCS Limits:

Alkalinity** ☐ = 80-120%	Bicarbonate Alkalinity** ☐ = 80-120%	Carbonate Alkalinity** ☐ = 80-120%	Specific Conductivity *☑ = 80-120%
Total Organic Carbon** ☐ = 80-120%	TDS** ☐ = 80-120%	Oil & Grease* ☐ = 80-120%	Ammonia Nitrogen as N* ☑ = 80-120%
COD Low* ☐ = 80-120%	COD High* ☐ = 80-120%	Nitrate Nitrogen as N**☐ = 80-120%	Nitrite Nitrogen as N** ☐= 80-120%
Hardness* ☐ = 80-120%	Chloride* ☑ = 80-120%	Sulfate (EPA 300.0)* ☑ = 80-120%	pH* ☐ = 98-102% TSS* NA

Other parameter(list) _____ %R = _____ ☐ Rec Limits= _____

Other parameter(list) _____ %R = _____ ☐ Rec Limits = _____

(MADEP has not yet defined LCS recovery limits for wet chemistry analyses.)

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and no-detect results within the batch as (J). If LCS recovery is <10%, non-detect results are rejected (R).

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs analyzed? List project samples that were spiked.

ACTION: If no, contact senior chemist to see if any were specified.

Yes [✓] No [ ] N/A [ ] Comments: OC-GW-202D chloride and sulfate

6.2 Is the MS/MSD Recovery Form present?

ACTION: If no, contact lab for resubmission of missing data.

Yes [✓] No [ ] N/A [ ] Comments:

6.3 Were matrix spikes analyzed at the required frequency of 1 per 20 samples per matrix?

ACTION: If any matrix spike data is missing, call lab for resubmission.

Yes [✓] No [ ] N/A [ ] Comments:

Yes [ ] **No** [✓] N/A [ ] Comments:

6.4 Are any wet chemistry analyte spike recoveries outside of the QC limits?

NOTE: $\%R = \frac{(SSR-SR)}{SA} \times 100\%$ Where: SSR = Spiked sample result
SR = Sample result
SA = Spike added

MS/MSD Recovery Limits:

Alkalinity* = NA
Bicarbonate Alkalinity* = NA
Carbonate alkalinity* = NA
Ammonia* (LACHAT) ☐ = 75-125%
Chloride*(SM 4500 Cl) ☑ = 75-125%
Specific Conductivity * = NA
Total Organic Carbon* = NA
TDS** = NA
Oil & Grease* = NA
COD Low* ☐ = 75-125%
COD High* ☐ = 75-125%
Nitrate Nitrogen as N** ☐ = 75-125%
Nitrite Nitrogen as N** ☐ = 75-125%
Hardness* ☐ = 75-125%
Sulfate (EPA 300.0)* ☑ = 75-125%
pH* = NA
TSS* = NA
Other parameter(list) _____ % R = _____ ☐ Rec Limits = _____

* = Laboratory Limits ** = Olin QAPP Limits (*MADEP has not yet defined LCS recovery limits for wet chemistry analyses.*)

NOTES: 1) If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.
2) If the MS/MSD was performed by the laboratory on a non-project sample, no qualification is required.

ACTION: MS/MSD flags only apply to the sample spiked. Do not evaluate if sample concentration is > 4X spike. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit but > 30%, qualify both positive results and non-detects (J). If the MS/MSD recovery is < 30% and the sample is non-detect, the results are considered unusable and flagged (R).

ACTION: Laboratory control limits apply when spiked sample results fall within the normal calibration range. If dilutions are required due to high sample concentrations, the data is evaluated, but no flags are applied.

6.5 Are any RPDs for MS/MSD recoveries outside of the QA/QC limits?

NOTE: $RPD = \frac{S-D}{(S+D)/2} \times 100\%$ Where S = MS result
D = MSD result

Yes [ ] **No [✓]** N/A [ ] Comments:

MS/MSD RPD Limits:

RPD ≤ 20

7.0 Laboratory Duplicate

Are the RPDs for the laboratory duplicates <20% unless otherwise specified below?

Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If the RPD is greater than specified limits, qualify all results for that analyte as estimated (J).

pH* ☐ = 3% Specific Conductivity *☑ = 5% TSS** ☐ = 6% TDS** ☐ = 6%

8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist. **Yes** [ ] No [✓] N/A [ ] Comments:

8.2 Do any rinsate blanks have positive results? Yes [ ] **No** [ ] N/A [✓] Comments:

ACTION: Evaluate rinsate results vs. blank results to determine if contaminant may be laboratory-derived. If not lab-related, qualify according to the table below.

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

NOTE: *MADEP does not require the collection of rinsate blanks.*

9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates. **Yes** [ ] No [✓] N/A [ ] Comments:

9.2 Were field duplicates collected per the required frequency? **Yes** [ ] No [ ] N/A [✓] Comments:

QAPP/IRSWP ☐ *MADEP Option 1(1 per 20)* ☐ *MADEP Option 3 (1 per 10)* ☐

9.3 Was the RPD ≤ 30% for waters ≤ 50% for soils? Calculate the RPD for results and attach to this review. **Yes** [ ] No [ ] N/A [✓] Comments:

ACTION:. Qualify data (J) for both sample results if the RPD exceeded.

Was any of the data qualified?

Yes [ ] **No** [✓] N/A [ ] Comments:

If so, apply data qualifiers directly to the DQE copy of laboratory report and **flag pages** for entry in database.

REFERENCES:-

MACTEC, 2007. "Draft Interim Response Steps Work Plan"; Olin Chemical Superfund Site, 51 Eames Street, Wilmington, Massachusetts.; Project No. 6300-06-0010/41.1; July 25, 2007.

MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Compendium of Quality Control Requirements and Performance Standards for Selected Analytical Protocols ," WSC-CAM #10-320, Final, Revision No. 1, 5 July 2010.

MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data in Support of Action Conducted Under the Massachusetts Contingency Plan (MCP)," WSC-CAM, Section VIIA, Final, Revision No. 1, 1 July 2010.

OLIN-WILMINGTON
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
ICP METALS BY METHOD 6010B/200.7

Reviewer/Date 12/7/11
Sr. Review/Date Chris Ricardi 1/4/12
Lab Report # 360-37596-1
Project # 6107110016.12

dissolved aluminum, chromium

1.0 Laboratory Deliverable Requirements

1.1 Laboratory Information: Was all of the following provided in the laboratory report? Yes [✓] No [ ] N/A [ ] Comments:
Check items received.

☑ *Name of Laboratory* ☑ *Address* ☑ *Project ID* ☑ *Phone #* ☑ *Sample identification – Field and Laboratory*
Client Information: ☑ *Name* ☑ *Address* ☑ *Client Contact* *(IDs must be cross-referenced)*

ACTION: If no, contact lab for submission of missing or illegible information.

1.2 Laboratory Report Certification Statement

Yes [✓] No [ ] N/A [ ] Comments:

Does the laboratory report include a completed Analytical Report Certification in the required format?

***ACTION**: If no, contact lab for submission of missing certification or certification with correct format.*

1.3 Laboratory Case Narrative:

Yes [✓] No [ ] N/A [ ] Comments:

☑ *Narrative serves as an exception report for the project and method QA/QC performance.* ☐ *Narrative includes an explanation of each discrepancy on the*

Certification Statement.

***ACTION**: If no, contact lab for submission of missing or illegible information.*

1.4 Chain of Custody (COC) copy present with all documentation completed Yes [✓] No [ ] N/A [ ] Comments:

NOTE: Olin receives and maintains the *original COC.*

ACTION: If no, contact lab for submission of copy of completed *COC.*

1.5 Sample Receipt Information (*Cooler Receipt Form present?*): Yes [✓] No [ ] N/A [ ] Comments:

Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

☑ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).

☑ Container type noted ☑ sample condition observed ☑ pH verified (where applicable) ☑ Field and lab IDs cross referenced

ACTION: If no, contact lab for submission of missing or incomplete documentation.

1.5.1 Were all samples delivered to the laboratory without breakage? **Yes** [✓] No [ ] N/A [ ] Comments:

1.5.2 Does the *Cooler Receipt Form* or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? Yes [ ] **No** [✓] N/A [ ] Comments:

1.6 Sample Results Section: *Was each of the following requirements supplied in the laboratory report for each sample?* **Yes** [✓] No [ ] N/A [ ] Comments:

☑ Field ID and Lab ID ☑ *Date and time collected* ☑ Analyst Initials ☑ *Dilution Factor* ☑ % moisture or solids ☑ *Reporting limits*
☑ *Clean-up method* ☑ Analysis method ☑ *Preparation method* ☑ *Date of preparation/extraction/digestion clean-up and analysis, where applicable*
☑ Matrix ☑ Target analytes and concentrations ☑ Units (soils must be reported in dry weight)

ACTION: If no, contact lab for submission of missing or incomplete information.

1.7 QA/QC Information: Was each of the following information supplied in the laboratory report for each sample batch? **Yes** [✓] No [ ] N/A [ ] Comments:

☑ Method blank results ☑ LCS recoveries ☑ MS/MSD recoveries and RPDs ☑ Laboratory duplicate results (where applicable)

ACTION: If no, contact lab for submission of missing or incomplete information.

2.0 Holding Times

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? Holding time for metals is 180 days from sample collection to analysis for both water and soil.

Yes [ ] **No** [✓] N/A [ ] Comments:

NOTE: List samples that exceed hold time with # of days exceeded on checklist

ACTION: If technical holding times are exceeded, qualify all positive results (J) and non-detects (UJ). If grossly exceeded (2X holding time) reject (R) all non-detect results.

3.0 Laboratory Method

3.1 Was the correct laboratory method used?

Yes [✓] No [ ] N/A [ ] Comments:

Water Digestion	3005A or 3010A or 3020A
Soil Digestion	3050B
Metals	6010B or 200.7

ACTION: If no, contact laboratory to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change and to request variance.

3.2 Are the practical quantitation limits the same as those specified by the ☐ SOW ☑ QAPP ☐ Lab ☐ MADEP

Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *Verify that the reported metals match the target list specified on the COC.*

ACTION: If no, evaluate variation with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.

3.3 Are results present for each sample in the SDG? Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, check Request for Analysis to verify if method was ordered and COC to verify that it was sent, and contact lab for resubmission of the missing data

3.4 If dilutions were required, were dilution factors reported? Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact the lab for submission.

4.0 Method Blanks

4.1 Is the Method Blank Summary present? Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, call the laboratory for submission of missing data.

4.2 Frequency of Analysis: Was a method blank analyzed for each digestion batch of < 20 field samples? Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact laboratory for justification. Consult senior chemist for action needed. Narrate non-compliance.

4.3 Is the method blank less than the PQLs for all target elements? Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *MADEP requires the method blank to be matrix matched and digested with the samples*

4.4 Do any method blanks have positive results for metals? Qualify data according to the following: Yes [ ] No [✓] N/A [ ] Comments:

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

ACTION: For any blank with positive results, list all contaminants for each method blank including the concentration detected and the flagging level (flagging level = 5x the blank value) and the associated samples and qualifiers.

5.0 Laboratory Control Standard

5.1 Was a laboratory control standard run with each analytical batch of 20 samples or less?

Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *A full target, second source LCS is required by MADEP.*
ACTION: Call laboratory for LCS form submittal. If data are not available, use professional judgement to evaluate data accuracy associated with that batch.

5.2 Is a LCS Summary Form present?

Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.3 Is the recovery of any analyte outside of MADEP control limits?

Yes [ ] **No** [✓] N/A [ ] Comments:

Sample Type	*MADEP % Rec*
Water	*80-120*
Soil	within Lab generated limits

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and non-detects results within the batch as (J). If LCS recovery is <30%, positive and non-detect results are rejected (R).

Comments:

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs ~~collected~~ analyzed? List project samples that were spiked. (W) 12/7/11

Yes [✓] No [ ] N/A [ ] Comments: OC-GW-26 MS only.

ACTION: If no, contact senior chemist to see if any were specified.

6.2 Is the Matrix Spike/Matrix Spike Duplicate Recovery Form present?

Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *A full target, second source MS/MSD is required by MADEP.*
ACTION: If any matrix spike data are missing, call lab for resubmission.

6.3 Were matrix spikes analyzed as indicated on the COC and project schedule?

Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If any matrix spike data are missing, call lab for resubmission. If none, no qualification is needed. Narrate non-compliance.

6.4 Are any metal spike recoveries outside of the QC limits?

Yes [ ] No [✓] N/A [ ] Comments:

Sample Type	***MADEP % Rec***	QAPP % Rec	Method
Water	*75-125*	N/A	6010B
Water	*N/A*	70-130	200.7
Soil	*75-125*	75-125	6010B

NOTE: $\%R = \frac{(SSR-SR)}{SA} \times 100\%$ Where: SSR = Spiked sample result, SR = Sample result, SA = Spike added

NOTE: If dilutions are required due to high sample concentrations (> 4X spike), the data are evaluated, but no flags are applied.

NOTE: If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.

ACTION: MS/MSD flags only apply to the sample spiked. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit, qualify positive results and non-detects (J).

6.5 Are any RPDs for MS/MSD recoveries outside of the QC limits? Yes [ ] **No** [ ] N/A [✓] Comments: MS only.

NOTE: RPD = $\frac{S-D}{(S+D)/2} \times 100\%$ Where: S = MS sample result
D = MSD sample result

NOTE: If dilutions are required due to high sample concentrations, the data are evaluated, but no flags are applied.

ACTION: If the RPD exceeds the control limit, qualify positive results and non-detects (J).

7.0 Laboratory Duplicate

7.1 Was a laboratory duplicate sample analyzed? If so, is the Laboratory Duplicate Sample Form present? **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *MADEP refers to this sample as a "matrix duplicate".*

ACTION: If not analyzed, qualification is not needed. If data is missing, contact laboratory for resubmission of report. Narrate non-compliance.

7.2 Is the RPD between the result for the laboratory duplicate sample and the result for the parent sample outside of the QA/QC limits? Yes [ ] **No** [✓] N/A [ ] Comments:

MADEP Laboratory Duplicate Sample RPD Criteria:	QAPP RPD
For aqueous results > 5× RL, RPD must be ± 20%	20
For aqueous results < 5× RL, RPD must be ≤ RL	20
For soil/sediment results > 5× RL, RPD must be ± 35%	20
For soil/sediment results < 5× RL, RPD must be ≤ 2× RL	20

ACTION: If the RPD exceeds the limits, qualify both positive results and non-detects as estimated and flag them J. Narrate non-compliance

8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist. **Yes** [ ] No [✓] N/A [ ] Comments:

8.2 Do any rinsate blanks have positive results? Yes [ ] **No** [ ] N/A [✓] Comments:

NOTE: *MADEP does not require the collection of rinsate blanks.*

ACTION: Evaluate rinsate results against blank results to determine if contaminant may be laboratory-derived. If results are not lab-related, qualify according to below.

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates. Yes [ ] **No** [✓] N/A [ ] Comments:

9.2 Were field duplicates collected per the required frequency? Yes [ ] No [ ] N/A [✓] Comments:

SOW ☐ QAPP *(1 per 10)* ☐ *MADEP Option 1 (1 per 20)* ☐ *MADEP Option 3 (1 per 10)* ☐

9.3 Was the RPD ≤ 50% for soils or waters? Calculate the RPD for all results and attach to this review. Yes [ ] No [ ] N/A [✓] Comments:

ACTION: RPD must be ≤50% for soil and water. Qualify data (J) for both sample results if the RPD exceeds 50%.

10.0 Special QA/QC

10.1 Were both total and dissolved metals analysis performed? If so, the dissolved metal concentration should not exceed that of the total metal. Yes [ ] **No** [✓] N/A [ ] Comments:

ACTION: If results for both total and dissolved are ≥ 5x the PQL **and** the dissolved concentration is 10% higher than the total, flag both results as estimated (J). If total and dissolved concentrations are less than 5x the PQL **and** the **difference** exceeds 2x the PQL, flag both results as estimated (J)

10.0 Application of Validation Qualifiers

Was any of the data qualified?

Yes [ ] **No** [✓] N/A [ ] Comments:

If so, apply data qualifiers directly to the DQE copy of laboratory report and **flag pages** for entry in database.

REFERENCES

LAW, 1999, "Final Quality Assurance Project Plan, Olin Wilmington Property, 51 Eames Street, Wilmington, MA", LAW Engineering and Environmental Services, Kennesaw, GA 30144. August 1999

U.S. Environmental Protection Agency (USEPA), 1989. "Region 1 Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses"; Hazardous Site Evaluation Division; February 1989.

MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Compendium of Quality Control Requirements and Performance Standards for Selected Analytical Protocols ," WSC-CAM #10-320, Final, Revision No. 1, 1 July 2010.

MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data in Support of Action Conducted Under the Massachusetts Contingency Plan (MCP)," WSC-CAM, Section VIIA, Final, Revision No. 1, 1 July 2010.

MADEP, 2010. "Quality Control Requirements and Performance Standards for the Analysis of Trace Metals by Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES) in Support of Response Actions under the Massachusetts Contingency Plan (MCP)" WSC-CAM, Final, Revision No. 1, 5 July 2010.

OLIN-WILMINGTON
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
WET CHEMISTRY PARAMETERS BY VARIOUS METHODS

Spec. Cond., Chloride, sulfate, Ammonia.

Reviewer/Date [illegible] 12/2/11
Sr. Review/Date Chris Ricardi 1/4/12
Lab Report # 360-37596-1
Project # 61071100016.12

Note: The following analyses will be evaluated according to the "MADEP QA/QC Guidelines for **Sampling, Data Evaluation and Reporting Activities.**" MADEP, however, may not list QA/QC criteria for every chemical analysis. Where not defined by MADEP, criteria will default to values stipulated in the QAPP. Where the QAPP does not define criteria, QA/QC requirements will default to limits employed by the laboratory.

1.0 Laboratory Deliverable Requirements

1.1 Laboratory Information: Was all of the following provided in the laboratory report? Yes [✓] No [ ] N/A [ ] Comments:
Check items received.

☑ *Name of Laboratory* ☑ *Address* ☑ *Project ID* ☑ *Phone #* ☑ *Sample identification – Field and Laboratory*
Client Information: ☑ *Name* ☑ *Address* ☑ *Client Contact* *(IDs must be cross-referenced)*

ACTION: If no, contact lab for submission of missing or illegible information.

1.2 Laboratory Report Certification Statement

Yes [✓] No [ ] N/A [ ] Comments:

Does the laboratory report include a completed Analytical Report Certification in the required format?

ACTION: *If no, contact lab for submission of missing certification or certification with correct format.*

1.3 Laboratory Case Narrative:

Yes [✓] No [ ] N/A [ ] Comments:

☑ *Narrative serves as an exception report for the project and method QA/QC performance.* ☐ *Narrative includes an explanation of each discrepancy on the Certification Statement.*

ACTION: *If no, contact lab for submission of missing or illegible information.*

1.4 Chain of Custody (COC) copy present with all documentation completed? Yes [✓] No [ ] N/A [ ] Comments:

Does the laboratory report include copies of Chain of Custody forms containing all samples in this SDG?

NOTE: Olin receives and maintains the *original* COC.

ACTION: If no, contact lab for submission of copy of missing completed COC.

1.5 Sample Receipt Information (*Cooler Receipt Form*): Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

Yes [✓] No [ ] N/A [ ] Comments:

☑ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).

☑ Container type noted ☑ Condition observed ☑ pH verified (where applicable) ☑ Field and lab IDs cross referenced

ACTION: If no, contact lab for submission of missing or incomplete documentation.

1.5.1 Were the correct bottles and preservatives used? Yes [✓] No [ ] N/A [ ] Comments:

Ammonia,– 1 Liter polyethylene/H_2SO_4 to pH<2,cool to 4°C

Oil & Grease – 1 Liter glass/HCL or H2SO4 to pH<2,cool to 4°C

Alkalinity – 1 Liter polyethylene/cool to 4°C

Chemical Oxygen Demand – 50 mL polyethylene/H_2SO_4 to pH<2,cool to 4°C

Chloride, pH, sulfate, nitrate, nitrite - 50 mL polyethylene/cool to 4°C

Nitrate/nitrite - H2SO4 to pH<2,cool to 4°C

Organic Carbon – 500 mL amber glass bottle/HCl or H_2SO_4 to pH<2,cool to 4°C

Sulfide – 50 mL polyethylene/ZnAcetate + NaOH to pH>9, cool to 4°C

Phenolics - H_2SO_4 to pH<2,cool to 4°C

Specific conductance, TDS, TSS – 100 mL polyethylene/cool to 4°C

ACTION: If no, inform senior chemist. Document justification for change in container/volume (if applicable), qualify positive and non-detect data (J) data if cooler temperature exceeds 10°C. Rejection of data requires professional judgment

1.5.2 Were all samples delivered to the laboratory without breakage? Yes [✓] No [ ] N/A [ ] Comments:

1.5.3 Does the *Cooler Receipt Form* or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? Yes [ ] No [✓] N/A [ ] Comments:

1.6 Sample Results Section: *Was the following information supplied in the laboratory report for each sample?*

Yes [✓] No [ ] N/A [ ] Comments:

- [✓] Field ID and Lab ID
- [N/A] *Clean-up method*
- [✓] Matrix
- [✓] Date and time collected
- [✓] Analysis method
- [✓] Target analytes and concentrations
- [✓] Analyst Initials
- [✓] Preparation method
- [✓] Dilution Factor
- [N/A] % moisture or solids
- [✓] Date of preparation/extraction/digestion clean-up and analysis, where applicable
- [✓] Units (soils must be reported in dry weight)
- [✓] Reporting limits

ACTION: If no, contact lab for submission of missing or incomplete information.

1.7 QA/QC Information: Was the following information provided in the laboratory report for each sample batch? Yes [✓] No [ ] N/A [ ] Comments:

- [✓] Method blank results
- [✓] LCS recoveries
- [N/A] MS/MSD recoveries and RPDs
- [N/A] Laboratory duplicate results (where applicable)

ACTION: If no, contact lab for submission of missing or incomplete information.

2.0 Holding Times Yes [ ] **No [✓]** N/A [ ] Comments:

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? The holding times are as follows:

28 days = ammonia, chemical oxygen demand, chloride, organic carbon, oil & grease, specific conductance, total organic carbon and sulfate

Alkalinity = 14 days | Sulfide, TDS, TSS = 7 days | pH = analyze immediately | Nitrate nitrogen as N = 48 hrs

Nitrite nitrogen as N = 48 hrs | Nitrate + Nitrite as N = 28 days

NOTE: List samples that exceed hold time with # of days exceeded on checklist

ACTION: If technical holding times are exceeded qualify results (J). For water samples that are grossly exceeded (>2X hold time) reject (R) all non-detect results. Professional judgment used to qualify soils.

3.0 Laboratory Method Yes [✓] No [ ] N/A [ ] Comments:

3.1 Was the correct laboratory method used?

ACTION: If no, contact lab to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change or to request variance.

3.2 Are the practical quantitation limits the same as those specified by the ☑ QAPP/IRSWP ☐ Lab? Yes [✓] No [ ] N/A [ ] Comments:

Note: *The MADEP QA/QC Guidelines do not yet list PQLs for wet chemistry analyses, therefore all criteria will default to values stipulated in the QAPP*. Where the QAPP does not define criteria, QA/QC requirements default to limits employed by the lab**. Other criteria may also apply.*

Ammonia* ☑ = 0.1 mg/ L
Alkalinity** ☐ = 1 mg/L
Bicarbonate Alkalinity** ☐ = 1 mg/L
Carbonate Alkalinity** ☐ = 1 mg/L
Nitrate Nitrogen as N* ☐ = .05 mg/L
Nitrite Nitrogen as N* ☐ = .01 mg/L
Chloride* ☑ = 1 mg/L
Hardness *☐ = 2 mg/L
Spec. Cond.** ☑ 3 umhos/cm
Total Organic Carbon** ☐ = 1 mg/L
Oil & Grease* ☐ = 5.5 mg/L
Sulfate (EPA 300.0)* ☑ = 2 mg/L
COD:* Low – 20 mg/L
COD* High - 50 mg/L ☐
TDS* ☐ = 10 mg/L
TSS* ☐ = 5 mg/L
pH* ☐ < 2 to > 12
Phenolic - 0.01 mg/L
Other parameter(list) _____ PQL = _____ ☐ Source of PQL = _____
Other parameter(list) _____ PQL = _____ ☐ Source of PQL = _____

ACTION: If no, evaluate change with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.

3.3 Are the appropriate parameter results present for each sample in the SDG? Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, check Request for Analysis to verify if method was ordered and COC to verify that it was sent, and contact lab for resubmission of the missing data

3.4 If *dilutions were required, were dilution factors reported?* Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact the lab for submission.

4.0 **Method Blanks** Yes [✓] No [ ] N/A [ ] Comments:

4.1 Are the Method Blank Summaries present?

ACTION: If no, call the laboratory for submission of missing data.

4.2 Was a method blank analyzed for each analysis batch of wet chemistry field samples of 20 or less? Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, document discrepancy in case narrative and contact lab for justification. Consult senior chemist for action needed.

4.3 Is the method blank less than the PQL? (See Section 3.2 for PQLs). **Yes [✓]** No [ ] N/A [ ] Comments:

4.4 Do any method blanks have positive results for wet chemistry parameters? Qualify data according to the following: Yes [ ] **No [✓]** N/A [ ] Comments:

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

ACTION: If any blank has positive results, list all the concentrations detected and flagging level (flagging level = 5 × blank value) on the checklist. List all affected samples and their qualifiers.

5.0 Laboratory Control Standards

5.1 Was a laboratory control standard (LCS) run with each analytical batch of 20 samples or less? **Yes [✓]** No [ ] N/A [ ] Comments:

ACTION: If no, call laboratory for LCS form submittal. If data is not available, use professional judgment to determine qualification actions for data associated with the batch.

5.2 Is a LCS Summary Form present? **Yes [✓]** No [ ] N/A [ ] Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.3 Is any wet chemistry analyte LCS recovery outside the control limits? Yes [ ] **No [✓]** N/A [ ] Comments:

LCS Limits:

Alkalinity** ☐ = 80-120%
Bicarbonate Alkalinity** ☐ = 80-120%
Carbonate Alkalinity** ☐ = 80-120%
Specific Conductivity *☐ = 80-120%
Total Organic Carbon** ☐ = 80-120%
TDS** ☐ = 80-120%
Oil & Grease* ☐ = 80-120%
Ammonia Nitrogen as N* ☑ = 80-120%
COD Low* ☐ = 80-120%
COD High* ☐ = 80-120%
Nitrate Nitrogen as N**☐ = 80-120%
Nitrite Nitrogen as N** ☐= 80-120%
Hardness* ☐ = 80-120%
Chloride* ☑ = 80-120%
Sulfate (EPA 300.0)* ☑ = 80-120%
pH* ☐ = 98-102%
TSS* NA

Other parameter(list) _____ %R = _____ ☐ Rec Limits= _____

Other parameter(list) _____ %R = _____ ☐ Rec Limits = _____

(MADEP has not yet defined LCS recovery limits for wet chemistry analyses.)

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and no-detect results within the batch as (J). If LCS recovery is <10%, non-detect results are rejected (R).

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs analyzed? List project samples that were spiked.

ACTION: If no, contact senior chemist to see if any were specified.

Yes [ ] No [✓] N/A [ ] Comments:

6.2 Is the MS/MSD Recovery Form present?

ACTION: If no, contact lab for resubmission of missing data.

Yes [ ] No [ ] N/A [✓] Comments:

6.3 Were matrix spikes analyzed at the required frequency of 1 per 20 samples per matrix?

ACTION: If any matrix spike data is missing, call lab for resubmission.

Yes [ ] No [ ] N/A [✓] Comments:

Yes [ ] **No** [ ] N/A [✓] Comments:

6.4 Are any wet chemistry analyte spike recoveries outside of the QC limits?

NOTE: $\%R = \frac{(SSR-SR)}{SA} \times 100\%$ Where: SSR = Spiked sample result
SR = Sample result
SA = Spike added

MS/MSD Recovery Limits:

Alkalinity* = NA	Bicarbonate Alkalinity* = NA	Carbonate alkalinity* = NA	Ammonia* (LACHAT) ☐ = 75-125%
Chloride*(SM 4500 Cl) ☐= 75-125%	Specific Conductivity * = NA	Total Organic Carbon* = NA	TDS** = NA
Oil & Grease* = NA	COD Low* ☐ = 75-125%	COD High* ☐ = 75-125%	Nitrate Nitrogen as N** ☐ = 75-125%
Nitrite Nitrogen as N** ☐ = 75-125%	Hardness* ☐ = 75-125%	Sulfate (EPA 300.0)* ☐ = 75-125%	pH* = NA TSS* = NA

Other parameter(list) _____ % R = _____ ☐ Rec Limits = _____

* = Laboratory Limits ** = Olin QAPP Limits (*MADEP has not yet defined LCS recovery limits for wet chemistry analyses.*)

NOTES: 1) If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.
2) If the MS/MSD was performed by the laboratory on a non-project sample, no qualification is required.

ACTION: MS/MSD flags only apply to the sample spiked. Do not evaluate if sample concentration is > 4X spike. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit but > 30%, qualify both positive results and non-detects (J). If the MS/MSD recovery is < 30% and the sample is non-detect, the results are considered unusable and flagged (R).

ACTION: Laboratory control limits apply when spiked sample results fall within the normal calibration range. If dilutions are required due to high sample concentrations, the data is evaluated, but no flags are applied.

6.5 Are any RPDs for MS/MSD recoveries outside of the QA/QC limits?

NOTE: $RPD = \frac{S-D}{(S+D)/2} \times 100\%$ Where S = MS result
D = MSD result

Yes [ ] **No** [ ] N/A [✓] Comments:

MS/MSD RPD Limits:

RPD ≤ 20

7.0 Laboratory Duplicate

Are the RPDs for the laboratory duplicates <20% unless otherwise specified below?

Yes [ ] No [ ] N/A [✓] Comments:

ACTION: If the RPD is greater than specified limits, qualify all results for that analyte as estimated (J).

pH* ☐ = 3% Specific Conductivity *☐ = 5% TSS** ☐ = 6% TDS** ☐ = 6%

8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist. **Yes** [ ] No [ ] N/A [✓] Comments:

8.2 Do any rinsate blanks have positive results? Yes [ ] **No** [ ] N/A [✓] Comments:

ACTION: Evaluate rinsate results vs. blank results to determine if contaminant may be laboratory-derived. If not lab-related, qualify according to the table below.

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

NOTE: *MADEP does not require the collection of rinsate blanks.*

9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates. **Yes** [ ] No [✓] N/A [ ] Comments:

9.2 Were field duplicates collected per the required frequency? **Yes** [ ] No [ ] N/A [✓] Comments:

QAPP/IRSWP ☐ *MADEP Option 1(1 per 20)* ☐ *MADEP Option 3 (1 per 10)* ☐

9.3 Was the RPD ≤ 30% for waters ≤ 50% for soils? Calculate the RPD for results and attach to this review. **Yes** [ ] No [ ] N/A [✓] Comments:

ACTION:. Qualify data (J) for both sample results if the RPD exceeded.

Was any of the data qualified?

Yes [ ] **No** [✓] N/A [ ] Comments:

If so, apply data qualifiers directly to the DQE copy of laboratory report and **flag pages** for entry in database.

REFERENCES:-

MACTEC, 2007. "Draft Interim Response Steps Work Plan"; Olin Chemical Superfund Site, 51 Eames Street, Wilmington, Massachusetts.; Project No. 6300-06-0010/41.1; July 25, 2007.

MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Compendium of Quality Control Requirements and Performance Standards for Selected Analytical Protocols ," WSC-CAM #10-320, Final, Revision No. 1, 5 July 2010.

MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data in Support of Action Conducted Under the Massachusetts Contingency Plan (MCP)," WSC-CAM, Section VIIA, Final, Revision No. 1, 1 July 2010.

OLIN-WILMINGTON
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
WET CHEMISTRY PARAMETERS BY VARIOUS METHODS

Reviewer/Date [signature] 12/7/11
Sr. Review/Date Chris Ricardi 1/4/12
Lab Report # 360-37491-1
Project # 6107110016.12

ammonia, spec conductance, sulfate, chloride, nitrate, nitrite

Note: The following analyses will be evaluated according to the "MADEP QA/QC Guidelines for **Sampling, Data Evaluation and Reporting Activities.**" MADEP, however, may not list QA/QC criteria for every chemical analysis. Where not defined by MADEP, criteria will default to values stipulated in the QAPP. Where the QAPP does not define criteria, QA/QC requirements will default to limits employed by the laboratory.

1.0 Laboratory Deliverable Requirements

1.1 Laboratory Information: Was all of the following provided in the laboratory report? **Yes** [✓] No [ ] N/A [ ] Comments:
Check items received.

☑ *Name of Laboratory* ☑ *Address* ☑ *Project ID* ☑ *Phone #* ☑ *Sample identification – Field and Laboratory*

Client Information: ☑ *Name* ☐ *Address* ☑ *Client Contact* *(IDs must be cross-referenced)*

ACTION: If no, contact lab for submission of missing or illegible information.

1.2 Laboratory Report Certification Statement

Yes [✓] *No* [ ] *N/A* [ ] *Comments:*

Does the laboratory report include a completed Analytical Report Certification in the required format?

***ACTION**: If no, contact lab for submission of missing certification or certification with correct format.*

1.3 Laboratory Case Narrative:

Yes [✓] *No* [ ] *N/A* [ ] *Comments:*

☑ *Narrative serves as an exception report for the project and method QA/QC performance.*

☐ *Narrative includes an explanation of each discrepancy on the Certification Statement.*

***ACTION**: If no, contact lab for submission of missing or illegible information.*

1.4 Chain of Custody (COC) copy present with all documentation completed? **Yes** [✓] No [ ] N/A [ ] Comments:

Does the laboratory report include copies of Chain of Custody forms containing all samples in this SDG?

NOTE: Olin receives and maintains the *original* COC.

ACTION: If no, contact lab for submission of copy of missing completed COC.

1.5 Sample Receipt Information (*Cooler Receipt Form*): Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

Yes [✓] No [ ] N/A [ ] Comments:

☑ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).

☑ Container type noted ☑ Condition observed ☑ pH verified (where applicable) ☐ Field and lab IDs cross referenced

ACTION: If no, contact lab for submission of missing or incomplete documentation.

1.5.1 Were the correct bottles and preservatives used?

Yes [✓] No [ ] N/A [ ] Comments:

✓ Ammonia,– 1 Liter polyethylene/H_2SO_4 to pH<2,cool to 4°C

Oil & Grease – 1 Liter glass/HCL or H2SO4 to pH<2,cool to 4°C

Alkalinity – 1 Liter polyethylene/cool to 4°C

Chemical Oxygen Demand – 50 mL polyethylene/H_2SO_4 to pH<2,cool to 4°C

✓ Chloride, pH, sulfate, nitrate, nitrite - 50 mL polyethylene/cool to 4°C

✓ Nitrate/nitrite - H2SO4 to pH<2,cool to 4°C

Organic Carbon – 500 mL amber glass bottle/HCl or H_2SO_4 to pH<2,cool to 4°C

Sulfide – 50 mL polyethylene/ZnAcetate + NaOH to pH>9, cool to 4°C

Phenolics - H_2SO_4 to pH<2,cool to 4°C

✓ Specific conductance, TDS, TSS – 100 mL polyethylene/cool to 4°C

ACTION: If no, inform senior chemist. Document justification for change in container/volume (if applicable), qualify positive and non-detect data (J) data if cooler temperature exceeds 10°C. Rejection of data requires professional judgment

1.5.2 Were all samples delivered to the laboratory without breakage?

Yes [✓] No [ ] N/A [ ] Comments:

1.5.3 Does the *Cooler Receipt Form* or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data?

Yes [ ] **No [✓]** N/A [ ] Comments: Due to the presence of elevated chloride peaks, samples OC-SW-1SC03, OC-SW-PZ16RR, OC-SW-PZ17RR were analyzed at a 10x dilution. RL's were elevated.

1.6 Sample Results Section: *Was the following information supplied in the laboratory report for each sample?*

Yes [✓] No [ ] N/A [ ] Comments:

- [✓] Field ID and Lab ID
- [✓] Clean-up method
- [✓] Matrix
- [✓] Date and time collected
- [✓] Analysis method
- [✓] Target analytes and concentrations
- [✓] Analyst Initials
- [✓] Preparation method
- [✓] Dilution Factor
- [✓] Date of preparation/extraction/digestion clean-up and analysis, where applicable
- [✓] Units (soils must be reported in dry weight)
- [✓] % moisture or solids
- [✓] Reporting limits

ACTION: If no, contact lab for submission of missing or incomplete information.

1.7 QA/QC Information: Was the following information provided in the laboratory report for each sample batch?

Yes [✓] No [ ] N/A [ ] Comments:

- [✓] Method blank results
- [✓] LCS recoveries
- [✓] MS/MSD recoveries and RPDs
- [ ] Laboratory duplicate results (where applicable)

ACTION: If no, contact lab for submission of missing or incomplete information.

2.0 Holding Times

Yes [ ] **No [✓]** N/A [ ] Comments:

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? The holding times are as follows:

✓ 28 days = ammonia, chemical oxygen demand, chloride, organic carbon, oil & grease, specific conductance, total organic carbon and sulfate

Alkalinity = 14 days | Sulfide, TDS, TSS = 7 days | pH = analyze immediately | ✓ Nitrate nitrogen as N = 48 hrs

✓ Nitrite nitrogen as N = 48 hrs | Nitrate + Nitrite as N = 28 days

NOTE: List samples that exceed hold time with # of days exceeded on checklist

ACTION: If technical holding times are exceeded qualify results (J). For water samples that are grossly exceeded (>2X hold time) reject (R) all non-detect results. Professional judgment used to qualify soils.

3.0 Laboratory Method

Yes [✓] No [ ] N/A [ ] Comments:

3.1 Was the correct laboratory method used?

ACTION: If no, contact lab to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change or to request variance.

3.2 Are the practical quantitation limits the same as those specified by the ☑ QAPP/IRSWP ☐ Lab? **Yes** [ ] No [✓] N/A [ ] Comments: samples OC-SW-1SC03, OC-SW-PZ16RR and OC-SW-PZ17RR were analyzed at a dilution due to chloride. LCs were elevated for nitrite.

Note: *The MADEP QA/QC Guidelines do not yet list PQLs for wet chemistry analyses, therefore all criteria will default to values stipulated in the QAPP*. Where the QAPP does not define criteria, QA/QC requirements default to limits employed by the lab**. Other criteria may also apply.*

Ammonia* ☑ = 0.1 mg/ L	Alkalinity** ☐ = 1 mg/L	Bicarbonate Alkalinity** ☐ = 1 mg/L	Carbonate Alkalinity** ☐ = 1 mg/L
Nitrate Nitrogen as N* ☑ = .05 mg/L	Nitrite Nitrogen as N* ☒ = .01 mg/L	Chloride* ☑ = 1 mg/L	Hardness * ☐ = 2 mg/L
Spec. Cond.** ☑ 3 umhos/cm	Total Organic Carbon** ☐ = 1 mg/L	Oil & Grease* ☐ = 5.5 mg/L	Sulfate (EPA 300.0)* ☑ = 2 mg/L
COD:* Low – 20 mg/L	COD* High - 50 mg/L ☐	TDS* ☐ = 10 mg/L	TSS* ☐ = 5 mg/L
pH* ☐ < 2 to > 12	Phenolic - 0.01 mg/L		

Other parameter(list) _____ PQL = _____ ☐ Source of PQL = _____

Other parameter(list) _____ PQL = _____ ☐ Source of PQL = _____

ACTION: If no, evaluate change with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.

3.3 Are the appropriate parameter results present for each sample in the SDG? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, check Request for Analysis to verify if method was ordered and COC to verify that it was sent, and contact lab for resubmission of the missing data

3.4 If *dilutions were required, were dilution factors reported?* **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact the lab for submission.

4.0 **<u>Method Blanks</u>** **Yes** [✓] No [ ] N/A [ ] Comments:

4.1 Are the Method Blank Summaries present?

ACTION: If no, call the laboratory for submission of missing data.

4.2 Was a method blank analyzed for each analysis batch of wet chemistry field samples of 20 or less? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, document discrepancy in case narrative and contact lab for justification. Consult senior chemist for action needed.

4.3 Is the method blank less than the PQL? (See Section 3.2 for PQLs). **Yes [✓]** No [ ] N/A [ ] Comments:

4.4 Do any method blanks have positive results for wet chemistry parameters? Qualify data according to the following: Yes [ ] **No [✓]** N/A [ ] Comments:

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

ACTION: If any blank has positive results, list all the concentrations detected and flagging level (flagging level = 5 × blank value) on the checklist. List all affected samples and their qualifiers.

5.0 Laboratory Control Standards

5.1 Was a laboratory control standard (LCS) run with each analytical batch of 20 samples or less? **Yes [✓]** No [ ] N/A [ ] Comments:

ACTION: If no, call laboratory for LCS form submittal. If data is not available, use professional judgment to determine qualification actions for data associated with the batch.

5.2 Is a LCS Summary Form present? **Yes [✓]** No [ ] N/A [ ] Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.3 Is any wet chemistry analyte LCS recovery outside the control limits? Yes [ ] **No [✓]** N/A [ ] Comments:

LCS Limits:

Alkalinity** ☐ = 80-120%	Bicarbonate Alkalinity** ☐ = 80-120%	Carbonate Alkalinity** ☐ = 80-120%	Specific Conductivity *☑ = 80-120%
Total Organic Carbon** ☐ = 80-120%	TDS** ☐ = 80-120%	Oil & Grease* ☐ = 80-120%	Ammonia Nitrogen as N* ☑ = 80-120%
COD Low* ☐ = 80-120%	COD High* ☐ = 80-120%	Nitrate Nitrogen as N**☑ = 80-120%	Nitrite Nitrogen as N** ☑ = 80-120%
Hardness* ☐ = 80-120%	Chloride* ☑ = 80-120%	Sulfate (EPA 300.0)* ☑ = 80-120%	pH* ☐ = 98-102% TSS* NA

Other parameter(list) _____ %R = _____ ☐ Rec Limits= _____

Other parameter(list) _____ %R = _____ ☐ Rec Limits = _____

(MADEP has not yet defined LCS recovery limits for wet chemistry analyses.)

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and no-detect results within the batch as (J). If LCS recovery is <10%, non-detect results are rejected (R).

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs analyzed? List project samples that were spiked.

ACTION: If no, contact senior chemist to see if any were specified.

Yes [✓] No [ ] N/A [ ] Comments: OC-SW-PZ18R

6.2 Is the MS/MSD Recovery Form present?

ACTION: If no, contact lab for resubmission of missing data.

Yes [✓] No [ ] N/A [ ] Comments:

6.3 Were matrix spikes analyzed at the required frequency of 1 per 20 samples per matrix?

ACTION: If any matrix spike data is missing, call lab for resubmission.

Yes [✓] No [ ] N/A [ ] Comments:

Yes [ ] **No [✓]** N/A [ ] Comments:

6.4 Are any wet chemistry analyte spike recoveries outside of the QC limits?

NOTE: $\%R = \frac{(SSR-SR)}{SA} \times 100\%$ Where: SSR = Spiked sample result
SR = Sample result
SA = Spike added

MS/MSD Recovery Limits:

Alkalinity* = NA | Bicarbonate Alkalinity* = NA | Carbonate alkalinity* = NA | Ammonia* (LACHAT) ☑ = 75-125%
Chloride*(SM 4500 Cl) ☑ = 75-125% | Specific Conductivity * = NA | Total Organic Carbon* = NA | TDS** = NA
Oil & Grease* = NA | COD Low* ☐ = 75-125% | COD High* ☐ = 75-125% | Nitrate Nitrogen as N** ☑ = 75-125%
Nitrite Nitrogen as N** ☑ = 75-125% | Hardness* ☐ = 75-125% | Sulfate (EPA 300.0)* ☐ = 75-125% | pH* = NA | TSS* = NA
Other parameter(list) _____ % R = _____ ☐ Rec Limits = _____

* = Laboratory Limits ** = Olin QAPP Limits (*MADEP has not yet defined LCS recovery limits for wet chemistry analyses.*)

NOTES: 1) If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.
2) If the MS/MSD was performed by the laboratory on a non-project sample, no qualification is required.

ACTION: MS/MSD flags only apply to the sample spiked. Do not evaluate if sample concentration is > 4X spike. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit but > 30%, qualify both positive results and non-detects (J). If the MS/MSD recovery is < 30% and the sample is non-detect, the results are considered unusable and flagged (R).

ACTION: Laboratory control limits apply when spiked sample results fall within the normal calibration range. If dilutions are required due to high sample concentrations, the data is evaluated, but no flags are applied.

6.5 Are any RPDs for MS/MSD recoveries outside of the QA/QC limits?

Yes [ ] **No [✓]** N/A [ ] Comments:

NOTE: $RPD = \frac{S-D}{(S+D)/2} \times 100\%$ Where S = MS result
D = MSD result

MS/MSD RPD Limits:

RPD ≤ 20

7.0 Laboratory Duplicate

Are the RPDs for the laboratory duplicates <20% unless otherwise specified below? **Yes [✓]** No [ ] N/A [ ] Comments:

ACTION: If the RPD is greater than specified limits, qualify all results for that analyte as estimated (J).

pH* ☐ = 3% Specific Conductivity *☑ = 5% TSS** ☐ = 6% TDS** ☐ = 6%

8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist. **Yes** [ ] No [✓] N/A [ ] Comments:

8.2 Do any rinsate blanks have positive results? Yes [ ] **No** [ ] N/A [✓] Comments:

ACTION: Evaluate rinsate results vs. blank results to determine if contaminant may be laboratory-derived. If not lab-related, qualify according to the table below.

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

***NOTE**: MADEP does not require the collection of rinsate blanks.*

9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates. **Yes** [✓] No [ ] N/A [ ] Comments: OC-SW-PZ18R

9.2 Were field duplicates collected per the required frequency? **Yes** [✓] No [ ] N/A [ ] Comments:

QAPP/IRSWP ☐ *MADEP Option 1(1 per 20)* ☑ *MADEP Option 3 (1 per 10)* ☐

9.3 Was the RPD ≤ 30% for waters ≤ 50% for soils? Calculate the RPD for results and attach to this review. **Yes** [✓] No [ ] N/A [ ] Comments: See attached.

VALIDATION REPORT
360-37491-1 WET CHEM
FIELD DUPLICATE RPD ASSESSMENT
NOVEMBER 2011
OLIN SLURRY WALL CAP

Sample ID	Analyte	Orig	Q	DUP	Q	RPD
OC-SW-PZ18R	Chloride	120		120		0
OC-SW-PZ18R	LAB SPECIFIC CONDUCTANCE	780		780		0
OC-SW-PZ18R	Nitrate as N	0.2		0.2		0
OC-SW-PZ18R	Nitrite as N	0.01	U	0.01	U	0
OC-SW-PZ18R	Nitrogen, as Ammonia	30		29		3.4
OC-SW-PZ18R	Sulfate	120		110		8.7

12/7/11

ACTION:. Qualify data (J) for both sample results if the RPD exceeded.

Was any of the data qualified? Yes [ ] **No** [✓] N/A [ ] Comments:

If so, apply data qualifiers directly to the DQE copy of laboratory report and **flag pages** for entry in database.

REFERENCES:-

MACTEC, 2007. "Draft Interim Response Steps Work Plan"; Olin Chemical Superfund Site, 51 Eames Street, Wilmington, Massachusetts.; Project No. 6300-06-0010/41.1; July 25, 2007.

MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Compendium of Quality Control Requirements and Performance Standards for Selected Analytical Protocols ," WSC-CAM #10-320, Final, Revision No. 1, 5 July 2010.

MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data in Support of Action Conducted Under the Massachusetts Contingency Plan (MCP)," WSC-CAM, Section VIIA, Final, Revision No. 1, 1 July 2010.

Version 1.3, Oct 2011

OLIN-WILMINGTON
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
ICP METALS BY METHOD 6010B/200.7

Reviewer/Date [signature] 1/4/12
Sr. Review/Date Chris Ricards 1/4/12
Lab Report # 360-37491-1
Project # 6107110016.12

total and dissolved aluminum, sodium, chromium

1.0 Laboratory Deliverable Requirements

1.1 Laboratory Information: Was all of the following provided in the laboratory report? Yes [✓] No [ ] N/A [ ] Comments:
Check items received.

☑ *Name of Laboratory* ☑ *Address* ☑ *Project ID* ☑ *Phone #* ☑ *Sample identification – Field and Laboratory*

Client Information: ☑ *Name* ☑ *Address* ☑ *Client Contact* *(IDs must be cross-referenced)*

ACTION: If no, contact lab for submission of missing or illegible information.

1.2 Laboratory Report Certification Statement

Yes [✓] *No [ ]* *N/A [ ]* *Comments:*

Does the laboratory report include a completed Analytical Report Certification in the required format?

***ACTION**: If no, contact lab for submission of missing certification or certification with correct format.*

1.3 Laboratory Case Narrative:

Yes [✓] *No [ ]* *N/A [ ]* *Comments:*

☑ *Narrative serves as an exception report for the project and method QA/QC performance.* ☐ *Narrative includes an explanation of each discrepancy on the*

Certification Statement.

***ACTION**: If no, contact lab for submission of missing or illegible information.*

1.4 Chain of Custody (COC) copy present with all documentation completed

Yes [✓] No [ ] N/A [ ] Comments:

NOTE: Olin receives and maintains the *original COC.*

ACTION: If no, contact lab for submission of copy of completed *COC.*

1.5 Sample Receipt Information (*Cooler Receipt Form present?*): Yes [✓] No [ ] N/A [ ] Comments:

Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

☑ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).

☑ Container type noted ☑ sample condition observed ☑ pH verified (where applicable) ☑ Field and lab IDs cross referenced

ACTION: If no, contact lab for submission of missing or incomplete documentation.

1.5.1 Were all samples delivered to the laboratory without breakage? Yes [✓] No [ ] N/A [ ] Comments:

1.5.2 Does the *Cooler Receipt Form* or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? Yes [ ] **No [✓]** N/A [ ] Comments:

1.6 Sample Results Section: *Was each of the following requirements supplied in the laboratory report for each sample?* Yes [✓] No [ ] N/A [ ] Comments:

☑ Field ID and Lab ID ☑ *Date and time collected* ☑ Analyst Initials ☑ *Dilution Factor* ☑ % moisture or solids ☑ *Reporting limits*
☑ *Clean-up method* ☑ Analysis method ☑ *Preparation method* ☑ *Date of preparation/extraction/digestion clean-up and analysis, where applicable*
☑ Matrix ☑ Target analytes and concentrations ☑ Units (soils must be reported in dry weight)

ACTION: If no, contact lab for submission of missing or incomplete information.

1.7 QA/QC Information: Was each of the following information supplied in the laboratory report for each sample batch? Yes [✓] No [ ] N/A [ ] Comments:

☑ Method blank results ☐ LCS recoveries ☑ MS/MSD recoveries and RPDs ☐ Laboratory duplicate results (where applicable)

ACTION: If no, contact lab for submission of missing or incomplete information.

2.0 Holding Times

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? Holding time for metals is 180 days from sample collection to analysis for both water and soil. Yes [ ] **No** [✓] N/A [ ] Comments:

NOTE: List samples that exceed hold time with # of days exceeded on checklist

ACTION: If technical holding times are exceeded, qualify all positive results (J) and non-detects (UJ). If grossly exceeded (2X holding time) reject (R) all non-detect results.

3.0 Laboratory Method

3.1 Was the correct laboratory method used? **Yes** [✓] No [ ] N/A [ ] Comments:

Water Digestion	3005A or 3010A or 3020A
Soil Digestion	3050B
Metals	6010B or 200.7

ACTION: If no, contact laboratory to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change and to request variance.

3.2 Are the practical quantitation limits the same as those specified by the ☐ SOW ☑ QAPP ☐ Lab ☐ MADEP **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *Verify that the reported metals match the target list specified on the COC.*

ACTION: If no, evaluate variation with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.

3.3 Are results present for each sample in the SDG? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, check Request for Analysis to verify if method was ordered and COC to verify that it was sent, and contact lab for resubmission of the missing data

3.4 If dilutions were required, were dilution factors reported? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact the lab for submission.

4.0 Method Blanks

4.1 Is the Method Blank Summary present? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, call the laboratory for submission of missing data.

4.2 Frequency of Analysis: Was a method blank analyzed for each digestion batch of < 20 field samples? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact laboratory for justification. Consult senior chemist for action needed. Narrate non-compliance.

4.3 Is the method blank less than the PQLs for all target elements? **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *MADEP requires the method blank to be matrix matched and digested with the samples*

4.4 Do any method blanks have positive results for metals? Qualify data according to the following: Yes [✓] **No** [ ] N/A [ ] Comments:

Total sodium (391 µg/L) was reported in the method blank associated with a subset of samples. An action level was established at five times the reported blank concentration for sodium. Associated sample results for sodium were greater than the action level. No qualification required.

Method: 6010B - Total Metals

Lab Sample ID: MB 360-83100/1-A
Matrix: Water
Analysis Batch: 83303

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 83100

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		100	13	ug/L		11/09/11 11:49	11/11/11 17:48	1
Chromium	ND		5.0	0.65	ug/L		11/09/11 11:49	11/11/11 17:48	1
Sodium	ND		2000	280	ug/L		11/09/11 11:49	11/11/11 17:48	1

Lab Sample ID: LCS 360-83100/2-A
Matrix: Water
Analysis Batch: 83303

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 83100

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	5000	5620		ug/L		112	80 - 120
Chromium	1000	1120		ug/L		112	80 - 120
Sodium	20000	20000		ug/L		100	80 - 120

Lab Sample ID: LCSD 360-83100/3-A
Matrix: Water
Analysis Batch: 83303

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 83100

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	5000	5820		ug/L		116	80 - 120	4	20
Chromium	1000	1150		ug/L		115	80 - 120	3	20
Sodium	20000	21400		ug/L		107	80 - 120	7	20

Lab Sample ID: 360-37491-6MS
Matrix: Water
Analysis Batch: 83303

Client Sample ID: OC-SW-PZ18R
Prep Type: Total/NA
Prep Batch: 83100

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	270		5000	6080		ug/L		116	75 - 125
Chromium	22		1000	1170		ug/L		115	75 - 125
Sodium	88000		20000	107000	4	ug/L		90	75 - 125

Lab Sample ID: 360-37491-6MSD
Matrix: Water
Analysis Batch: 83303

Client Sample ID: OC-SW-PZ18R
Prep Type: Total/NA
Prep Batch: 83100

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	270		5000	5940		ug/L		113	75 - 125	2	20
Chromium	22		1000	1140		ug/L		111	75 - 125	3	20
Sodium	88000		20000	105000	4	ug/L		84	75 - 125	1	20

Lab Sample ID: MB 360-83163/1-A
Matrix: Water
Analysis Batch: 83365

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 83163

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		100	13	ug/L		11/10/11 08:48	11/14/11 14:28	1
Chromium	ND		5.0	0.65	ug/L		11/10/11 08:48	11/14/11 14:28	1
Sodium	391	J	2000	280	ug/L		11/10/11 08:48	11/14/11 14:28	1

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

ACTION: For any blank with positive results, list all contaminants for each method blank including the concentration detected and the flagging level (flagging level = 5x the blank value) and the associated samples and qualifiers.

5.0 Laboratory Control Standard

5.1 Was a laboratory control standard run with each analytical batch of 20 samples or less? **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *A full target, second source LCS is required by MADEP.*
ACTION: Call laboratory for LCS form submittal. If data are not available, use professional judgement to evaluate data accuracy associated with that batch.

5.2 Is a LCS Summary Form present? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.3 Is the recovery of any analyte outside of MADEP control limits? Yes [ ] **No** [✓] N/A [ ] Comments:

Sample Type	MADEP % Rec
Water	80-120
Soil	within Lab generated limits

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and non-detects results within the batch as (J). If LCS recovery is <30%, positive and non-detect results are rejected (R).

Comments:

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs collected? List project samples that were spiked.

Yes [✓] No [ ] N/A [ ] Comments: OC-BW-PZ18R

ACTION: If no, contact senior chemist to see if any were specified.

6.2 Is the Matrix Spike/Matrix Spike Duplicate Recovery Form present?

Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *A full target, second source MS/MSD is required by MADEP.*
ACTION: If any matrix spike data are missing, call lab for resubmission.

6.3 Were matrix spikes analyzed as indicated on the COC and project schedule?

Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If any matrix spike data are missing, call lab for resubmission. If none, no qualification is needed. Narrate non-compliance.

6.4 Are any metal spike recoveries outside of the QC limits?

Yes [ ] **No** [✓] N/A [ ] Comments:

Sample Type	***MADEP % Rec***	QAPP % Rec	Method
Water	*75-125*	N/A	6010B
Water	*N/A*	70-130	200.7
Soil	*75-125*	75-125	6010B

NOTE: $\%R = \frac{(SSR-SR)}{SA} \times 100\%$ Where: SSR = Spiked sample result, SR = Sample result, SA = Spike added

NOTE: If dilutions are required due to high sample concentrations (> 4X spike), the data are evaluated, but no flags are applied.

NOTE: If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.

ACTION: MS/MSD flags only apply to the sample spiked. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit, qualify positive results and non-detects (J).

6.5 Are any RPDs for MS/MSD recoveries outside of the QC limits? Yes [ ] **No** [✓] N/A [ ] Comments:

NOTE: $RPD = \frac{S-D}{(S+D)/2} \times 100\%$ Where: S = MS sample result, D = MSD sample result

NOTE: If dilutions are required due to high sample concentrations, the data are evaluated, but no flags are applied.

ACTION: If the RPD exceeds the control limit, qualify positive results and non-detects (J).

7.0 Laboratory Duplicate

7.1 Was a laboratory duplicate sample analyzed? If so, is the Laboratory Duplicate Sample Form present? **Yes** [ ] No [✓] N/A [ ] Comments:

NOTE: *MADEP refers to this sample as a "matrix duplicate".*

ACTION: If not analyzed, qualification is not needed. If data is missing, contact laboratory for resubmission of report. Narrate non-compliance.

7.2 Is the RPD between the result for the laboratory duplicate sample and the result for the parent sample outside of the QA/QC limits? Yes [ ] **No** [ ] N/A [✓] Comments:

MADEP Laboratory Duplicate Sample RPD Criteria:	QAPP RPD
For aqueous results > 5× RL, RPD must be ± 20%	20
For aqueous results < 5× RL, RPD must be ≤ RL	20
For soil/sediment results > 5× RL, RPD must be ± 35%	20
For soil/sediment results < 5× RL, RPD must be ≤ 2× RL	20

ACTION: If the RPD exceeds the limits, qualify both positive results and non-detects as estimated and flag them J. Narrate non-compliance

8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist.

Yes [ ] No [✓] N/A [ ] Comments:

8.2 Do any rinsate blanks have positive results?

Yes [ ] **No** [ ] N/A [✓] Comments:

NOTE: *MADEP does not require the collection of rinsate blanks.*

ACTION: Evaluate rinsate results against blank results to determine if contaminant may be laboratory-derived. If results are not lab-related, qualify according to below.

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates.

Yes [✓] **No** [ ] N/A [ ] Comments: OC-SW-PZ18R

9.2 Were field duplicates collected per the required frequency? **Yes** [✓] No [ ] N/A [ ] Comments:

SOW ☐ QAPP *(1 per 10)* ☑ *MADEP Option 1 (1 per 20)* ☐ *MADEP Option 3 (1 per 10)* ☐

9.3 Was the RPD ≤ 50% for soils or waters? Calculate the RPD for all results and attach to this review. **Yes** [✓] No [ ] N/A [ ] Comments: See attached.

ACTION: RPD must be ≤50% for soil and water. Qualify data (J) for both sample results if the RPD exceeds 50%.

10.0 Special QA/QC

10.1 Were both total and dissolved metals analysis performed? If so, the dissolved metal concentration should not exceed that of the total metal. Yes [✓] **No** [ ] N/A [ ] Comments:

A subset of dissolved sodium results were greater than 10% above total sodium results. Total and dissolved sodium results in samples:

OC-SW-1SC02
OC-SW-PZ16RR
OC-SW-PZ17RR
OC-SW-PZ18RR DUP
OC-SW-SD17

were qualified estimated (J) (TD).

See attached.

ACTION: If results for both total and dissolved are ≥ 5x the PQL **and** the dissolved concentration is 10% higher than the total, flag both results as estimated (J). If total and dissolved concentrations are less than 5x the PQL **and** the **difference** exceeds 2x the PQL, flag both results as estimated (J)

VALIDATION REPORT
360-37491-1 METALS
FIELD DUPLICATE RPD ASSESSMENT
NOVEMBER 2011
OLIN SLURRY WALL CAP

Sample ID	Analyte	Orig	Q	DUP	Q	RPD
OC-SW-PZ18R D	Aluminum	170		180		5.7
OC-SW-PZ18R D	Chromium	14		15		6.9
OC-SW-PZ18R D	Sodium	96000		96000		0
OC-SW-PZ18R T	Aluminum	270		260		3.8
OC-SW-PZ18R T	Chromium	22		21		4.7
OC-SW-PZ18R T	Sodium	88000		83000		5.8

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T	360-37491	OC-SW-ISCO1	Sodium	89000	
D	360-37491	OC-SW-ISCO1	Sodium	98000	10
T	360-37491	OC-SW-ISCO2	Sodium	84000	
D	360-37491	OC-SW-ISCO2	Sodium	100000	19
T	360-37491	OC-SW-ISCO3	Sodium	93000	
D	360-37491	OC-SW-ISCO3	Sodium	100000	8
T	360-37491	OC-SW-PZ16RR	Sodium	110000	
D	360-37491	OC-SW-PZ16RR	Sodium	130000	18
T	360-37491	OC-SW-PZ17RR	Sodium	120000	
D	360-37491	OC-SW-PZ17RR	Sodium	140000	17
T	360-37491	OC-SW-PZ18R	Sodium	88000	
D	360-37491	OC-SW-PZ18R	Sodium	96000	9
T	360-37491	OC-SW-PZ18R-DUP	Sodium	83000	
D	360-37491	OC-SW-PZ18R-DUP	Sodium	96000	16
T	360-37491	OC-SW-SD17	Sodium	120000	
D	360-37491	OC-SW-SD17	Sodium	140000	17

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Method: 6010B - Dissolved Metals - Dissolved

Client Sample ID: OC-SW-ISC01
Date Collected: 11/08/11 12:45
Date Received: 11/08/11 17:10

Lab Sample ID: 360-37491-1
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	150		100	13	ug/L			11/15/11 17:05	1
Chromium	13		5.0	0.65	ug/L			11/15/11 17:05	1
Sodium	98000		2000	280	ug/L			11/15/11 17:05	1

Client Sample ID: OC-SW-ISC02
Date Collected: 11/08/11 11:45
Date Received: 11/08/11 17:10

Lab Sample ID: 360-37491-2
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	130		100	13	ug/L			11/15/11 17:08	1
Chromium	27		5.0	0.65	ug/L			11/15/11 17:08	1
Sodium	100000	J	2000	280	ug/L			11/15/11 17:08	1

Client Sample ID: OC-SW-ISC03
Date Collected: 11/08/11 11:30
Date Received: 11/08/11 17:10

Lab Sample ID: 360-37491-3
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	28	J	100	13	ug/L			11/15/11 17:11	1
Chromium	ND		5.0	0.65	ug/L			11/15/11 17:11	1
Sodium	100000		2000	280	ug/L			11/15/11 17:11	1

Client Sample ID: OC-SW-PZ16RR
Date Collected: 11/08/11 11:55
Date Received: 11/08/11 17:10

Lab Sample ID: 360-37491-4
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	69	J	100	13	ug/L			11/15/11 17:18	1
Chromium	23		5.0	0.65	ug/L			11/15/11 17:18	1
Sodium	130000	J	2000	280	ug/L			11/15/11 17:18	1

Client Sample ID: OC-SW-PZ17RR
Date Collected: 11/08/11 12:10
Date Received: 11/08/11 17:10

Lab Sample ID: 360-37491-5
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	110		100	13	ug/L			11/15/11 17:21	1
Chromium	55		5.0	0.65	ug/L			11/15/11 17:21	1
Sodium	140000	J	2000	280	ug/L			11/15/11 17:21	1

Client Sample ID: OC-SW-PZ18R
Date Collected: 11/08/11 12:30
Date Received: 11/08/11 17:10

Lab Sample ID: 360-37491-6
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	170		100	13	ug/L			11/15/11 16:47	1
Chromium	14		5.0	0.65	ug/L			11/15/11 16:47	1
Sodium	96000		2000	280	ug/L			11/15/11 16:47	1

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Method: 6010B - Dissolved Metals - Dissolved

Client Sample ID: OC-SW-SD17
Date Collected: 11/08/11 12:20
Date Received: 11/08/11 17:10

Lab Sample ID: 360-37491-7
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1900		100	13	ug/L			11/15/11 17:24	1
Chromium	370		5.0	0.65	ug/L			11/15/11 17:24	1
Sodium	140000	J	2000	280	ug/L			11/15/11 17:24	1

Client Sample ID: OC-SW-PZ18R-DUP
Date Collected: 11/08/11 12:30
Date Received: 11/08/11 17:10

Lab Sample ID: 360-37491-8
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	180		100	13	ug/L			11/15/11 17:26	1
Chromium	15		5.0	0.65	ug/L			11/15/11 17:26	1
Sodium	96000	J	2000	280	ug/L			11/15/11 17:26	1

12/7/11

Method: 6010B - Total Metals

Client Sample ID: OC-SW-ISC01
Date Collected: 11/08/11 12:45
Date Received: 11/08/11 17:10

Lab Sample ID: 360-37491-1
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	330		100	13	ug/L		11/09/11 11:49	11/11/11 18:17	1
Chromium	30		5.0	0.65	ug/L		11/09/11 11:49	11/11/11 18:17	1
Sodium	89000		2000	280	ug/L		11/09/11 11:49	11/11/11 18:17	1

Client Sample ID: OC-SW-ISC02
Date Collected: 11/08/11 11:45
Date Received: 11/08/11 17:10

Lab Sample ID: 360-37491-2
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	4000		100	13	ug/L		11/09/11 11:49	11/11/11 18:20	1
Chromium	750		5.0	0.65	ug/L		11/09/11 11:49	11/11/11 18:20	1
Sodium	84000	J	2000	280	ug/L		11/09/11 11:49	11/11/11 18:20	1

Client Sample ID: OC-SW-ISC03
Date Collected: 11/08/11 11:30
Date Received: 11/08/11 17:10

Lab Sample ID: 360-37491-3
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	200		100	13	ug/L		11/09/11 11:49	11/11/11 18:23	1
Chromium	2.0	J	5.0	0.65	ug/L		11/09/11 11:49	11/11/11 18:23	1
Sodium	93000		2000	280	ug/L		11/09/11 11:49	11/11/11 18:23	1

Client Sample ID: OC-SW-PZ16RR
Date Collected: 11/08/11 11:55
Date Received: 11/08/11 17:10

Lab Sample ID: 360-37491-4
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1800		100	13	ug/L		11/09/11 11:49	11/11/11 18:26	1
Chromium	380		5.0	0.65	ug/L		11/09/11 11:49	11/11/11 18:26	1
Sodium	110000	J	2000	280	ug/L		11/09/11 11:49	11/11/11 18:26	1

Client Sample ID: OC-SW-PZ17RR
Date Collected: 11/08/11 12:10
Date Received: 11/08/11 17:10

Lab Sample ID: 360-37491-5
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	2000		100	13	ug/L		11/09/11 11:49	11/11/11 18:29	1
Chromium	470		5.0	0.65	ug/L		11/09/11 11:49	11/11/11 18:29	1
Sodium	120000	J	2000	280	ug/L		11/09/11 11:49	11/11/11 18:29	1

Client Sample ID: OC-SW-PZ18R
Date Collected: 11/08/11 12:30
Date Received: 11/08/11 17:10

Lab Sample ID: 360-37491-6
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	270		100	13	ug/L		11/09/11 11:49	11/11/11 17:57	1
Chromium	22		5.0	0.65	ug/L		11/09/11 11:49	11/11/11 17:57	1
Sodium	88000		2000	280	ug/L		11/09/11 11:49	11/11/11 17:57	1

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Method: 6010B - Total Metals

Client Sample ID: OC-SW-SD17
Date Collected: 11/08/11 12:20
Date Received: 11/08/11 17:10

Lab Sample ID: 360-37491-7
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	2100		100	13	ug/L		11/10/11 08:48	11/14/11 15:00	1
Chromium	470		5.0	0.65	ug/L		11/10/11 08:48	11/14/11 15:00	1
Sodium	120000	B	2000	280	ug/L		11/10/11 08:48	11/14/11 15:00	1

Client Sample ID: OC-SW-PZ18R-DUP
Date Collected: 11/08/11 12:30
Date Received: 11/08/11 17:10

Lab Sample ID: 360-37491-8
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	260		100	13	ug/L		11/10/11 08:48	11/14/11 14:52	1
Chromium	21		5.0	0.65	ug/L		11/10/11 08:48	11/14/11 14:52	1
Sodium	83000	B	2000	280	ug/L		11/10/11 08:48	11/14/11 14:52	1

12/7/11

10.0 Application of Validation Qualifiers

Was any of the data qualified?

Yes [✓] No [ ] N/A [ ] Comments:

If so, apply data qualifiers directly to the DQE copy of laboratory report and **flag pages** for entry in database.

REFERENCES

LAW, 1999, "Final Quality Assurance Project Plan, Olin Wilmington Property, 51 Eames Street, Wilmington, MA", LAW Engineering and Environmental Services, Kennesaw, GA 30144. August 1999

U.S. Environmental Protection Agency (USEPA), 1989. "Region 1 Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses"; Hazardous Site Evaluation Division; February 1989.

MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Compendium of Quality Control Requirements and Performance Standards for Selected Analytical Protocols ," WSC-CAM #10-320, Final, Revision No. 1, 1 July 2010.

MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data in Support of Action Conducted Under the Massachusetts Contingency Plan (MCP)," WSC-CAM, Section VIIA, Final, Revision No. 1, 1 July 2010.

MADEP, 2010. "Quality Control Requirements and Performance Standards for the Analysis of Trace Metals by Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES) in Support of Response Actions under the Massachusetts Contingency Plan (MCP)" WSC-CAM, Final, Revision No. 1, 5 July 2010.

OLIN-WILMINGTON
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
ICP METALS BY METHOD 6010B/200.7

Reviewer/Date 12/9/11
Sr. Review/Date Chris Ricardi 1/4/12
Lab Report # 360-37545-1
Project # 6107110016.12

total aluminum, chromium, iron.

1.0 Laboratory Deliverable Requirements

1.1 Laboratory Information: Was all of the following provided in the laboratory report? **Yes** [✓] No [ ] N/A [ ] Comments:
Check items received.

☑ *Name of Laboratory* ☑ *Address* ☐ *Project ID* ☑ *Phone #* ☐ *Sample identification – Field and Laboratory*
Client Information: ☑ *Name* ☑ *Address* ☑ *Client Contact* *(IDs must be cross-referenced)*

ACTION: If no, contact lab for submission of missing or illegible information.

1.2 Laboratory Report Certification Statement ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

Does the laboratory report include a completed Analytical Report Certification in the required format?

***ACTION**: If no, contact lab for submission of missing certification or certification with correct format.*

1.3 Laboratory Case Narrative: ***Yes*** [✓] *No* [ ] *N/A* [ ] *Comments:*

☑ *Narrative serves as an exception report for the project and method QA/QC performance.* ☐ *Narrative includes an explanation of each discrepancy on the*

Certification Statement.

***ACTION**: If no, contact lab for submission of missing or illegible information.*

1.4 Chain of Custody (COC) copy present with all documentation completed **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: Olin receives and maintains the *original COC.*

ACTION: If no, contact lab for submission of copy of completed *COC.*

1.5 Sample Receipt Information (*Cooler Receipt Form present?*): Yes [✓] No [ ] N/A [ ] Comments:

Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

☑ Sample temperature confirmed: must be 1° – 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).

☑ Container type noted ☐ sample condition observed ☑ pH verified (where applicable) ☐ Field and lab IDs cross referenced

ACTION: If no, contact lab for submission of missing or incomplete documentation.

1.5.1 Were all samples delivered to the laboratory without breakage? Yes [✓] No [ ] N/A [ ] Comments:

1.5.2 Does the *Cooler Receipt Form* or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? Yes [ ] **No** [✓] N/A [ ] Comments:

1.6 Sample Results Section: *Was each of the following requirements supplied in the laboratory report for each sample?* Yes [✓] No [ ] N/A [ ] Comments:

☑ Field ID and Lab ID ☑ *Clean-up method* ☐ Matrix
☐ *Date and time collected* ☑ Analysis method ☑ Target analytes and concentrations
☐ Analyst Initials ☑ *Preparation method*
☑ *Dilution Factor* ☐ % moisture or solids ☑ *Reporting limits*
☑ *Date of preparation/extraction/digestion clean-up and analysis, where applicable*
☑ Units (soils must be reported in dry weight)

ACTION: If no, contact lab for submission of missing or incomplete information.

1.7 QA/QC Information: Was each of the following information supplied in the laboratory report for each sample batch? Yes [✓] No [ ] N/A [ ] Comments:

☑ Method blank results ☑ LCS recoveries ☐ MS/MSD recoveries and RPDs ☐ Laboratory duplicate results (where applicable)

ACTION: If no, contact lab for submission of missing or incomplete information.

2.0 Holding Times

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? Holding time for metals is 180 days from sample collection to analysis for both water and soil. Yes [ ] **No** [✓] N/A [ ] Comments:

NOTE: List samples that exceed hold time with # of days exceeded on checklist

ACTION: If technical holding times are exceeded, qualify all positive results (J) and non-detects (UJ). If grossly exceeded (2X holding time) reject (R) all non-detect results.

3.0 Laboratory Method

3.1 Was the correct laboratory method used? **Yes** [✓] No [ ] N/A [ ] Comments:

Water Digestion	3005A or 3010A or 3020A
Soil Digestion	3050B
Metals	6010B or 200.7

ACTION: If no, contact laboratory to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change and to request variance.

3.2 Are the practical quantitation limits the same as those specified by the ☐ SOW ☑ QAPP ☐ Lab ☐ MADEP **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *Verify that the reported metals match the target list specified on the COC.*

ACTION: If no, evaluate variation with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.

3.3 Are results present for each sample in the SDG? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, check Request for Analysis to verify if method was ordered and COC to verify that it was sent, and contact lab for resubmission of the missing data

3.4 If dilutions were required, were dilution factors reported? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact the lab for submission.

4.0 Method Blanks

4.1 Is the Method Blank Summary present? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, call the laboratory for submission of missing data.

4.2 Frequency of Analysis: Was a method blank analyzed for each digestion batch of < 20 field samples? **Yes** [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact laboratory for justification. Consult senior chemist for action needed. Narrate non-compliance.

4.3 Is the method blank less than the PQLs for all target elements? **Yes** [✓] No [ ] N/A [ ] Comments:

NOTE: *MADEP requires the method blank to be matrix matched and digested with the samples*

4.4 Do any method blanks have positive results for metals? Qualify data according to the following: Yes [✓] **No** [ ] N/A [ ] Comments:

Iron (10 mg/kg and 1.75 mg/kg) was reported in the method blanks associated with all samples. Action levels were established at 5x the blank concentrations. Iron results in samples were greater than the action levels; no qualification was required.

6010 Aluminum (6.36 mg/kg) was reported in the method blank associated with a subset of samples. Action level established at 5x blank concentration. Associated ~~Sample results for aluminum were greater than the~~ no qualification required.

Method: 6010B - Metals (ICP)

Lab Sample ID: MB 360-83454/1-A
Matrix: Solid
Analysis Batch: 83608

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 83454

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	6.36	J	7.5	1.1	mg/Kg		11/16/11 12:50	11/18/11 11:57	1
Chromium	ND		0.50	0.25	mg/Kg		11/16/11 12:50	11/18/11 11:57	1
Iron	16.0	J	18	0.94	mg/Kg		11/16/11 12:50	11/18/11 11:57	1

Lab Sample ID: LCDSRM 360-83454/3-A LCDSRM
Matrix: Solid
Analysis Batch: 83608

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 83454

Analyte	Spike Added	LCDSRM Result	LCDSRM Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	7740	13000		mg/Kg		169	89.9 - 279	1	30
Chromium	272	242		mg/Kg		89	68.0 - 124	0	30
Iron	13100	20400		mg/Kg		156	68.6 - 239	1	30

Lab Sample ID: LCSSRM 360-83454/2-A
Matrix: Solid
Analysis Batch: 83608

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 83454

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	7740	13200		mg/Kg		170	89.9 - 279
Chromium	272	243		mg/Kg		89	68.0 - 124
Iron	13100	20200		mg/Kg		154	68.6 - 239

Lab Sample ID: 360-37595-3 MS
Matrix: Solid
Analysis Batch: 83608

Client Sample ID: OC-SD-SD3-0.0/0.5
Prep Type: Total/NA
Prep Batch: 83454

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	9700	B	417	10600	4	mg/Kg	☼	224	75 - 125
Chromium	35		83.3	139		mg/Kg	☼	125	75 - 125
Iron	14000	B	417	15900	4	mg/Kg	☼	494	75 - 125

Lab Sample ID: 360-37595-3 MSD
Matrix: Solid
Analysis Batch: 83608

Client Sample ID: OC-SD-SD3-0.0/0.5
Prep Type: Total/NA
Prep Batch: 83454

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	9700	B	422	10000	4	mg/Kg	☼	79	75 - 125	6	35
Chromium	35		84.3	130		mg/Kg	☼	113	75 - 125	7	35
Iron	14000	B	422	13300	4	mg/Kg	☼	-124	75 - 125	18	35

Lab Sample ID: MB 360-83671/1-A
Matrix: Solid
Analysis Batch: 83721

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 83671

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		7.5	1.1	mg/Kg		11/21/11 10:33	11/21/11 17:20	1
Chromium	ND		0.50	0.25	mg/Kg		11/21/11 10:33	11/21/11 17:20	1
Iron	1.75	J	18	0.94	mg/Kg		11/21/11 10:33	11/21/11 17:20	1

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

ACTION: For any blank with positive results, list all contaminants for each method blank including the concentration detected and the flagging level (flagging level = 5x the blank value) and the associated samples and qualifiers.

5.0 Laboratory Control Standard

5.1 Was a laboratory control standard run with each analytical batch of 20 samples or less?

Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *A full target, second source LCS is required by MADEP.*
ACTION: Call laboratory for LCS form submittal. If data are not available, use professional judgement to evaluate data accuracy associated with that batch.

5.2 Is a LCS Summary Form present?

Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.3 Is the recovery of any analyte outside of MADEP control limits?

Yes [✓] **No** [ ] N/A [ ] Comments:

Sample Type	*MADEP % Rec*
Water	*80-120*
Soil	within Lab generated limits

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and non-detects results within the batch as (J). If LCS recovery is <30%, positive and non-detect results are rejected (R).

LCS/LCSD percent recoveries of aluminum (170, 169, 197+221) and iron (154, 156, 167, and 174) exceeded the upper QC limit of 120. Aluminum and iron results were qualified estimated (J) (LCS-H).

Comments:

Method: 6010B - Metals (ICP)

Client Sample ID: OC-SD-SD1-0.0/0.5
Date Collected: 11/11/11 12:35
Date Received: 11/11/11 17:25

Lab Sample ID: 360-37595-1
Matrix: Solid
Percent Solids: 71.5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	11000	B	13	1.8	mg/Kg	☼	11/16/11 12:50	11/18/11 12:26	1
Chromium	30		0.84	0.42	mg/Kg	☼	11/16/11 12:50	11/18/11 12:26	1
Iron	13000	B	30	1.6	mg/Kg	☼	11/16/11 12:50	11/18/11 12:26	1

Client Sample ID: OC-SD-SD2-0.0/0.5
Date Collected: 11/11/11 12:20
Date Received: 11/11/11 17:25

Lab Sample ID: 360-37595-2
Matrix: Solid
Percent Solids: 75.0

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	11000	B	11	1.6	mg/Kg	☼	11/16/11 12:50	11/18/11 12:29	1
Chromium	130		0.72	0.36	mg/Kg	☼	11/16/11 12:50	11/18/11 12:29	1
Iron	14000	B	25	1.4	mg/Kg	☼	11/16/11 12:50	11/18/11 12:29	1

Client Sample ID: OC-SD-SD3-0.0/0.5
Date Collected: 11/11/11 12:10
Date Received: 11/11/11 17:25

Lab Sample ID: 360-37595-3
Matrix: Solid
Percent Solids: 72.3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	9700	B	13	1.8	mg/Kg	☼	11/16/11 12:50	11/18/11 12:11	1
Chromium	35		0.84	0.42	mg/Kg	☼	11/16/11 12:50	11/18/11 12:11	1
Iron	14000	B	29	1.6	mg/Kg	☼	11/16/11 12:50	11/18/11 12:11	1

Client Sample ID: OC-SD-SD3 DUP-0.0/0.5
Date Collected: 11/11/11 12:10
Date Received: 11/11/11 17:25

Lab Sample ID: 360-37595-4
Matrix: Solid
Percent Solids: 74.2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	9800		11	1.6	mg/Kg	☼	11/21/11 10:33	11/21/11 18:10	1
Chromium	45		0.73	0.37	mg/Kg	☼	11/21/11 10:33	11/21/11 18:10	1
Iron	14000	B	26	1.4	mg/Kg	☼	11/21/11 10:33	11/21/11 18:10	1

Client Sample ID: OC-SD-SD4-0.0/0.5
Date Collected: 11/11/11 12:00
Date Received: 11/11/11 17:25

Lab Sample ID: 360-37595-5
Matrix: Solid
Percent Solids: 65.7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	9900	B	14	2.1	mg/Kg	☼	11/16/11 12:50	11/18/11 12:32	1
Chromium	140		0.95	0.48	mg/Kg	☼	11/16/11 12:50	11/18/11 12:32	1
Iron	17000	B	33	1.8	mg/Kg	☼	11/16/11 12:50	11/18/11 12:32	1

Client Sample ID: OC-SD-SD5-0.0/0.5
Date Collected: 11/11/11 11:50
Date Received: 11/11/11 17:25

Lab Sample ID: 360-37595-6
Matrix: Solid
Percent Solids: 73.3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	11000		11	1.7	mg/Kg	☼	11/21/11 10:33	11/21/11 18:13	1
Chromium	59		0.76	0.38	mg/Kg	☼	11/21/11 10:33	11/21/11 18:13	1
Iron	15000	B	27	1.4	mg/Kg	☼	11/21/11 10:33	11/21/11 18:13	1

12/9/11

Method: 6010B - Metals (ICP) (Continued)

Lab Sample ID: LCDSRM 360-83671/3-A LCDSRM — **Client Sample ID: Lab Control Sample Dup**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 83721 — **Prep Batch: 83671**

Analyte	Spike Added	LCDSRM Result	LCDSRM Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	7740	17100		mg/Kg		221	89.9 - 279	12	30
Chromium	272	255		mg/Kg		94	68.0 - 124	5	30
Iron	13100	23000		mg/Kg		176	68.6 - 239	5	30

Lab Sample ID: LCSSRM 360-83671/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 83721 — **Prep Batch: 83671**

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	7740	15200		mg/Kg		197	89.9 - 279
Chromium	272	267		mg/Kg		98	68.0 - 124
Iron	13100	21900		mg/Kg		167	68.6 - 239

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs collected? List project samples that were spiked.

Yes [✓] No [ ] N/A [ ] Comments: OC-SD-SD3

ACTION: If no, contact senior chemist to see if any were specified.

6.2 Is the Matrix Spike/Matrix Spike Duplicate Recovery Form present?

Yes [✓] No [ ] N/A [ ] Comments:

NOTE: *A full target, second source MS/MSD is required by MADEP.*
ACTION: If any matrix spike data are missing, call lab for resubmission.

6.3 Were matrix spikes analyzed as indicated on the COC and project schedule?

Yes [✓] No [ ] N/A [ ] Comments:

ACTION: If any matrix spike data are missing, call lab for resubmission. If none, no qualification is needed. Narrate non-compliance.

6.4 Are any metal spike recoveries outside of the QC limits?

Yes [✓] **No** [ ] N/A [ ] Comments:

Sample Type	*MADEP % Rec*	QAPP % Rec	Method
Water	*75-125*	N/A	6010B
Water	*N/A*	70-130	200.7
Soil	*75-125*	75-125	6010B

MS and or MSD percent recoveries of aluminum (224) and iron (494 and -124) were outside of QC limits. Unspiked sample concentrations of aluminum and iron were greater than 4x spike concentrations. No qualification was required.

NOTE: $\%R = \frac{(SSR-SR)}{SA} \times 100\%$ Where: SSR = Spiked sample result, SR = Sample result, SA = Spike added

NOTE: If dilutions are required due to high sample concentrations (> 4X spike), the data are evaluated, but no flags are applied.

NOTE: If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.

ACTION: MS/MSD flags only apply to the sample spiked. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit, qualify positive results and non-detects (J).

6.5 Are any RPDs for MS/MSD recoveries outside of the QC limits? Yes [ ] **No** [✓] N/A [ ] Comments:

NOTE: $RPD = \frac{S-D}{(S+D)/2} \times 100\%$ Where: S = MS sample result
D = MSD sample result

NOTE: If dilutions are required due to high sample concentrations, the data are evaluated, but no flags are applied.

ACTION: If the RPD exceeds the control limit, qualify positive results and non-detects (J).

7.0 Laboratory Duplicate

7.1 Was a laboratory duplicate sample analyzed? If so, is the Laboratory Duplicate Sample Form present? **Yes** [ ] No [✓] N/A [ ] Comments:

NOTE: *MADEP refers to this sample as a "matrix duplicate".*

ACTION: If not analyzed, qualification is not needed. If data is missing, contact laboratory for resubmission of report. Narrate non-compliance.

7.2 Is the RPD between the result for the laboratory duplicate sample and the result for the parent sample outside of the QA/QC limits? Yes [ ] **No** [ ] N/A [✓] Comments:

MADEP Laboratory Duplicate Sample RPD Criteria:	QAPP RPD
For aqueous results > 5× RL, RPD must be ± 20%	20
For aqueous results < 5× RL, RPD must be ≤ RL	20
For soil/sediment results > 5× RL, RPD must be ± 35%	20
For soil/sediment results < 5× RL, RPD must be ≤ 2× RL	20

ACTION: If the RPD exceeds the limits, qualify both positive results and non-detects as estimated and flag them J. Narrate non-compliance

8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist.

Yes [ ] No [✓] N/A [ ] Comments:

8.2 Do any rinsate blanks have positive results?

Yes [ ] **No** [ ] N/A [✓] Comments:

NOTE: *MADEP does not require the collection of rinsate blanks.*

ACTION: Evaluate rinsate results against blank results to determine if contaminant may be laboratory-derived. If results are not lab-related, qualify according to below.

If the sample concentration is < 5 × blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates.

Yes [✓] **No** [ ] N/A [ ] Comments:

GC-SD300010.5

9.2 Were field duplicates collected per the required frequency? Yes [✓] No [ ] N/A [ ] Comments:

SOW ☐ QAPP *(1 per 10)* ☑ *MADEP Option 1 (1 per 20)* ☐ *MADEP Option 3 (1 per 10)* ☐

9.3 Was the RPD ≤ 50% for soils or waters? Calculate the RPD for all results and attach to this review. Yes [✓] No [ ] N/A [ ] Comments: See attached.

ACTION: RPD must be ≤50% for soil and water. Qualify data (J) for both sample results if the RPD exceeds 50%.

10.0 Special QA/QC

10.1 Were both total and dissolved metals analysis performed? If so, the dissolved metal concentration should not exceed that of the total metal. Yes [ ] No [✓] N/A [ ] Comments:

ACTION: If results for both total and dissolved are ≥ 5x the PQL **and** the dissolved concentration is 10% higher than the total, flag both results as estimated (J). If total and dissolved concentrations are less than 5x the PQL **and** the **difference** exceeds 2x the PQL, flag both results as estimated (J)

VALIDATION REPORT
360-37595-1 METALS SEDIMENTS
FIELD DUPLICATE RPD ASSESSMENT
NOVEMBER 2011
OLIN SLURRY WALL CAP

Sample ID	Analyte	Orig	Q	DUP	Q	RPD
OC-SD-SD3-0.0/0.5	Aluminum	9700	J	9800	J	1.0
OC-SD-SD3-0.0/0.5	Chromium	35		45		25
OC-SD-SD3-0.0/0.5	Iron	14000	J	14000	J	0

10.0 Application of Validation Qualifiers

Was any of the data qualified?

Yes [✓] **No** [ ] N/A [ ] Comments:

If so, apply data qualifiers directly to the DQE copy of laboratory report and **flag pages** for entry in database.

REFERENCES

LAW, 1999, "Final Quality Assurance Project Plan, Olin Wilmington Property, 51 Eames Street, Wilmington, MA", LAW Engineering and Environmental Services, Kennesaw, GA 30144. August 1999

U.S. Environmental Protection Agency (USEPA), 1989. "Region 1 Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses"; Hazardous Site Evaluation Division; February 1989.

MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Compendium of Quality Control Requirements and Performance Standards for Selected Analytical Protocols ," WSC-CAM #10-320, Final, Revision No. 1, 1 July 2010.

MADEP, 2010. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data in Support of Action Conducted Under the Massachusetts Contingency Plan (MCP)," WSC-CAM, Section VIIA, Final, Revision No. 1, 1 July 2010.

MADEP, 2010. "Quality Control Requirements and Performance Standards for the Analysis of Trace Metals by Inductively Coupled Plasma-Atomic Emission Spectrometry (ICP-AES) in Support of Response Actions under the Massachusetts Contingency Plan (MCP)" WSC-CAM, Final, Revision No. 1, 5 July 2010.

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TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Westfield
Westfield Executive Park
53 Southampton Road
Westfield, MA 01085
Tel: (413)572-4000

CHECKED FOR COMPLETENESS OF PARAMETERS ORDERED BY:

TestAmerica Job ID: 360-37491-1
Client Project/Site: Olin Chemical Surfacewater

For:
Olin Corporation
PO BOX 248
Charleston, Tennessee 37310-0248

CHECKED FOR COMPLETENESS OF PARAMETERS ORDERED BY:

Attn: Mr. James Cashwell

Authorized for release by:
11/28/2011 2:29:40 PM
Chris Reynolds
QA Manager
chris.reynolds@testamericainc.com

Designee for

Becky Mason
Project Manager II
becky.mason@testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Job ID: 360-37491-1

Laboratory: TestAmerica Westfield

Narrative

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

TestAmerica's Reporting Limits (RLs) for this report may not always meet WSC-CAM-III method reporting limits due to various reasons such as methodology, dilutions or moisture content (soils). TestAmerica's MA pivot table EDD documents which compound(s) exceed certain regulatory standards. If not included with your deliverables, please contact your Project Manager about the availability of this EDD for your report.

RECEIPT

The samples were received on 11/08/2011; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was C.

Note: All samples that require thermal preservation are considered acceptable if the arrival temperature is within the method's specified temperature range or for general analysis, ranging from 6°C to just above the freezing temperature of water. Samples that are hand delivered, immediately following collection, may not meet these criteria; however, they will be considered acceptable according to NELAC and State standards, if there is evidence that the chilling process has begun, such as stored and transported to the laboratory on ice.

DISSOLVED METALS

Samples OC-SW-ISC01 (360-37491-1), OC-SW-ISC02 (360-37491-2), OC-SW-ISC03 (360-37491-3), OC-SW-PZ16RR (360-37491-4), OC-SW-PZ17RR (360-37491-5), OC-SW-PZ18R (360-37491-6), OC-SW-SD17 (360-37491-7) and OC-SW-PZ18R-DUP (360-37491-8) were analyzed for dissolved metals in accordance with EPA SW-846 Method 6010B. The samples were analyzed on 11/15/2011.

At the request of the client, an abbreviated/modified MCP analyte list was reported for this job.

No difficulties were encountered during the dissolved metals analyses.

All quality control parameters were within the acceptance limits.

TOTAL METALS (ICP)

Samples OC-SW-ISC01 (360-37491-1), OC-SW-ISC02 (360-37491-2), OC-SW-ISC03 (360-37491-3), OC-SW-PZ16RR (360-37491-4), OC-SW-PZ17RR (360-37491-5), OC-SW-PZ18R (360-37491-6), OC-SW-SD17 (360-37491-7) and OC-SW-PZ18R-DUP (360-37491-8) were analyzed for total metals (ICP) in accordance with EPA SW-846 Method 6010B. The samples were prepared on 11/09/2011 and 11/10/2011 and analyzed on 11/11/2011 and 11/14/2011.

Sodium was detected in method blank MB 360-83163/1-A at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged "J". If the associated sample reported a result above the MDL and/or RL, the result has been "B" flagged. Refer to the QC report for details.

At the request of the client, an abbreviated/modified MCP analyte list was reported for this job.

No other difficulties were encountered during the metals analyses.

All other quality control parameters were within the acceptance limits.

SPECIFIC CONDUCTIVITY

Samples OC-SW-ISC01 (360-37491-1), OC-SW-ISC02 (360-37491-2), OC-SW-ISC03 (360-37491-3), OC-SW-PZ16RR (360-37491-4),

Job ID: 360-37491-1 (Continued)

Laboratory: TestAmerica Westfield (Continued)

OC-SW-PZ17RR (360-37491-5), OC-SW-PZ18R (360-37491-6), OC-SW-SD17 (360-37491-7) and OC-SW-PZ18R-DUP (360-37491-8) were analyzed for specific conductivity in accordance with SM20 2510B. The samples were analyzed on 11/12/2011.

No difficulties were encountered during the conductivity analyses.

All quality control parameters were within the acceptance limits.

ANIONS (28 DAY HOLD TIME)

Samples OC-SW-ISC01 (360-37491-1), OC-SW-ISC02 (360-37491-2), OC-SW-ISC03 (360-37491-3), OC-SW-PZ16RR (360-37491-4), OC-SW-PZ17RR (360-37491-5), OC-SW-PZ18R (360-37491-6), OC-SW-SD17 (360-37491-7) and OC-SW-PZ18R-DUP (360-37491-8) were analyzed for anions (28 day hold time) in accordance with EPA Method 300.0. The samples were analyzed on 11/09/2011 and 11/10/2011.

Samples OC-SW-ISC01 (360-37491-1)[10X], OC-SW-ISC02 (360-37491-2)[10X], OC-SW-ISC03 (360-37491-3)[10X], OC-SW-PZ16RR (360-37491-4)[10X], OC-SW-PZ17RR (360-37491-5)[10X], OC-SW-PZ18R (360-37491-6)[10X], OC-SW-SD17 (360-37491-7)[10X] and OC-SW-PZ18R-DUP (360-37491-8)[10X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No difficulties were encountered during the anions analyses.

All quality control parameters were within the acceptance limits.

ANIONS (48 HR HOLD TIME)

Samples OC-SW-ISC01 (360-37491-1), OC-SW-ISC02 (360-37491-2), OC-SW-ISC03 (360-37491-3), OC-SW-PZ16RR (360-37491-4), OC-SW-PZ17RR (360-37491-5), OC-SW-PZ18R (360-37491-6), OC-SW-SD17 (360-37491-7) and OC-SW-PZ18R-DUP (360-37491-8) were analyzed for anions (48 hr hold time) in accordance with EPA Method 300.0. The samples were analyzed on 11/09/2011 and 11/10/2011.

Samples OC-SW-ISC03 (360-37491-3)[10X], OC-SW-PZ16RR (360-37491-4)[10X] and OC-SW-PZ17RR (360-37491-5)[10X] required dilution prior to analysis due to the presence of elevated chloride concentration which co-elutes with the nitrite peak . The reporting limits have been adjusted accordingly.

No difficulties were encountered during the anions analyses.

All quality control parameters were within the acceptance limits.

AMMONIA

Samples OC-SW-ISC01 (360-37491-1), OC-SW-ISC02 (360-37491-2), OC-SW-ISC03 (360-37491-3), OC-SW-PZ16RR (360-37491-4), OC-SW-PZ17RR (360-37491-5), OC-SW-PZ18R (360-37491-6), OC-SW-SD17 (360-37491-7) and OC-SW-PZ18R-DUP (360-37491-8) were analyzed for ammonia in accordance with Lachat 107-06-1B. The samples were prepared on 11/15/2011 and analyzed on 11/16/2011.

Ammonia failed the recovery criteria high for the MS of sample OC-SW-PZ18RMS (360-37491-6) in batch 360-83489.

Ammonia failed the recovery criteria high for the MSD of sample OC-SW-PZ18RMSD (360-37491-6) in batch 360-83489. The presence of the '4' qualifier in the report indicates analytes where the concentration in the unspiked sample exceeded four times the spiking amount.

Refer to the QC report for details.

Samples OC-SW-ISC01 (360-37491-1)[10X], OC-SW-ISC02 (360-37491-2)[10X], OC-SW-PZ16RR (360-37491-4)[10X], OC-SW-PZ17RR (360-37491-5)[10X], OC-SW-PZ18R (360-37491-6)[10X], OC-SW-SD17 (360-37491-7)[10X] and OC-SW-PZ18R-DUP (360-37491-8)[10X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No other difficulties were encountered during the ammonia analyses.

All other quality control parameters were within the acceptance limits.

MassDEP Analytical Protocol Certification Form

Laboratory Name: **TestAmerica Westfield** Project #: **360-37491-1**

Project Location: **Olin Wilmington MA** RTN:

This form provides certifications for the following data set: list Laboratory Sample ID Number(s):

360-37491-1 [1-8]

Matrices: [X] Groundwater/Surface Water [ ] Soil/Sediment [ ] Drinking Water [ ] Air [ ] Other:

CAM Protocols (check all that apply below):

8260 VOC CAM II A [ ]	7470/7471 Hg CAM III B [ ]	Mass DEP VPH CAM IV A [ ]	8081 Pesticides CAM V B [ ]	7196 Hex Cr CAM VI B [ ]	Mass DEP APH CAM IX A [ ]
8270 SVOC CAM II B [ ]	7010 Metals CAM III C [ ]	Mass DEP EPH CAM IV B [ ]	8151 Herbicides CAM V C [ ]	8330 Explosives CAM VIII A [ ]	TO-15 VOC CAM IX B [ ]
6010 Metals CAM III A [X]	6020 Metals CAM III D [ ]	8082 PCB CAM V A [ ]	9014 Total Cyanide/PAC CAM VI A [ ]	332.0 Perchlorate CAM VIII B [ ]	

Affirmative Responses to Questions A through F are required for "Presumptive Certainty" status

A	Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding time.	[X] Yes [ ] No
B	Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed?	[X] Yes [ ] No
C	Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances?	[X] Yes [ ] No
D	Does the laboratory report comply with all the reporting requirements specified in CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	[X] Yes [ ] No
E	a. VPH, EPH and APH Methods only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications). b. APH and TO-15 Methods only: Was the complete analyte list reported for each method?	[ ] Yes [ ] No [ ] Yes [ ] No
F	Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to Questions A through E)?	[X] Yes [ ] No

Responses to Questions G, H and I below are required for "Presumptive Certainty" status

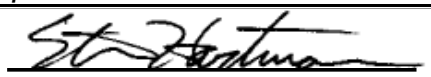
G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)?	[X] Yes [ ] No[1]

***Data User Note:* Data that achieve "Presumptive Certainty" status may not necessarily meet the data usability and representativeness requirements described in 310 CMR 40. 1056 (2)(k) and WCS-07-350**

H	Were **all** QC performance standards specified in the CAM protocol(s) achieved?	[ ] Yes [X] No
I	Were results reported for the complete analyte list specified in the selected CAM protocol(s) ?	[ ] Yes [X] No

[1] All negative responses must be addressed in an attached laboratory narrative.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, is accurate and complete.

Signature:  Position: Laboratory Director

Printed Name: Steven C. Hartmann Date: 11/28/11 14:15

This form has been electronically signed and approved

Detection Summary

Client: Olin Corporation
Project/Site: Olin Chemical Surfacewater

TestAmerica Job ID: 360-37491-1

Client Sample ID: OC-SW-ISC01 — Lab Sample ID: 360-37491-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	150		100	13	ug/L	1		6010B	Dissolved
Chromium	13		5.0	0.65	ug/L	1		6010B	Dissolved
Sodium	98000		2000	280	ug/L	1		6010B	Dissolved
Aluminum	330		100	13	ug/L	1		6010B	Total/NA
Chromium	30		5.0	0.65	ug/L	1		6010B	Total/NA
Sodium	89000		2000	280	ug/L	1		6010B	Total/NA

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Nitrate as N	0.20		0.050	0.050	mg/L	1		300.0	Total/NA
Sulfate	110		20	20	mg/L	10		300.0	Total/NA
Chloride	120		10	10	mg/L	10		300.0	Total/NA
Ammonia	25		1.0	1.0	mg/L	10		L107-06-1B	Total/NA
Specific Conductance	760		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

Client Sample ID: OC-SW-ISC02 — Lab Sample ID: 360-37491-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	130		100	13	ug/L	1		6010B	Dissolved
Chromium	27		5.0	0.65	ug/L	1		6010B	Dissolved
Sodium	100000		2000	280	ug/L	1		6010B	Dissolved
Aluminum	4000		100	13	ug/L	1		6010B	Total/NA
Chromium	750		5.0	0.65	ug/L	1		6010B	Total/NA
Sodium	84000		2000	280	ug/L	1		6010B	Total/NA

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Nitrate as N	1.1		0.050	0.050	mg/L	1		300.0	Total/NA
Sulfate	180		20	20	mg/L	10		300.0	Total/NA
Chloride	97		10	10	mg/L	10		300.0	Total/NA
Ammonia	33		1.0	1.0	mg/L	10		L107-06-1B	Total/NA
Specific Conductance	860		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

Client Sample ID: OC-SW-ISC03 — Lab Sample ID: 360-37491-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	28	J	100	13	ug/L	1		6010B	Dissolved
Sodium	100000		2000	280	ug/L	1		6010B	Dissolved
Aluminum	200		100	13	ug/L	1		6010B	Total/NA
Chromium	2.0	J	5.0	0.65	ug/L	1		6010B	Total/NA
Sodium	93000		2000	280	ug/L	1		6010B	Total/NA

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Nitrate as N	1.0		0.050	0.050	mg/L	1		300.0	Total/NA
Sulfate	33		2.0	2.0	mg/L	1		300.0	Total/NA
Chloride	170		10	10	mg/L	10		300.0	Total/NA
Ammonia	1.7		0.10	0.10	mg/L	1		L107-06-1B	Total/NA
Specific Conductance	740		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

Client Sample ID: OC-SW-PZ16RR — Lab Sample ID: 360-37491-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	69	J	100	13	ug/L	1		6010B	Dissolved
Chromium	23		5.0	0.65	ug/L	1		6010B	Dissolved
Sodium	130000		2000	280	ug/L	1		6010B	Dissolved
Aluminum	1800		100	13	ug/L	1		6010B	Total/NA
Chromium	380		5.0	0.65	ug/L	1		6010B	Total/NA
Sodium	110000		2000	280	ug/L	1		6010B	Total/NA

Client Sample ID: OC-SW-PZ16RR (Continued) — Lab Sample ID: 360-37491-4

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Nitrate as N	1.8		0.050	0.050	mg/L	1		300.0	Total/NA
Sulfate	160		20	20	mg/L	10		300.0	Total/NA
Chloride	120		10	10	mg/L	10		300.0	Total/NA
Ammonia	31		1.0	1.0	mg/L	10		L107-06-1B	Total/NA
Specific Conductance	950		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

Client Sample ID: OC-SW-PZ17RR — Lab Sample ID: 360-37491-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	110		100	13	ug/L	1		6010B	Dissolved
Chromium	55		5.0	0.65	ug/L	1		6010B	Dissolved
Sodium	140000		2000	280	ug/L	1		6010B	Dissolved
Aluminum	2000		100	13	ug/L	1		6010B	Total/NA
Chromium	470		5.0	0.65	ug/L	1		6010B	Total/NA
Sodium	120000		2000	280	ug/L	1		6010B	Total/NA

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Nitrate as N	1.8		0.050	0.050	mg/L	1		300.0	Total/NA
Sulfate	180		20	20	mg/L	10		300.0	Total/NA
Chloride	130		10	10	mg/L	10		300.0	Total/NA
Ammonia	33		1.0	1.0	mg/L	10		L107-06-1B	Total/NA
Specific Conductance	1000		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

Client Sample ID: OC-SW-PZ18R — Lab Sample ID: 360-37491-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	170		100	13	ug/L	1		6010B	Dissolved
Chromium	14		5.0	0.65	ug/L	1		6010B	Dissolved
Sodium	96000		2000	280	ug/L	1		6010B	Dissolved
Aluminum	270		100	13	ug/L	1		6010B	Total/NA
Chromium	22		5.0	0.65	ug/L	1		6010B	Total/NA
Sodium	88000		2000	280	ug/L	1		6010B	Total/NA

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Nitrate as N	0.20		0.050	0.050	mg/L	1		300.0	Total/NA
Sulfate	120		20	20	mg/L	10		300.0	Total/NA
Chloride	120		10	10	mg/L	10		300.0	Total/NA
Ammonia	30		1.0	1.0	mg/L	10		L107-06-1B	Total/NA
Specific Conductance	780		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

Client Sample ID: OC-SW-SD17 — Lab Sample ID: 360-37491-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	1900		100	13	ug/L	1		6010B	Dissolved
Chromium	370		5.0	0.65	ug/L	1		6010B	Dissolved
Sodium	140000		2000	280	ug/L	1		6010B	Dissolved
Aluminum	2100		100	13	ug/L	1		6010B	Total/NA
Chromium	470		5.0	0.65	ug/L	1		6010B	Total/NA
Sodium	120000	B	2000	280	ug/L	1		6010B	Total/NA

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Nitrate as N	1.7		0.050	0.050	mg/L	1		300.0	Total/NA
Sulfate	190		20	20	mg/L	10		300.0	Total/NA
Chloride	130		10	10	mg/L	10		300.0	Total/NA
Ammonia	32		1.0	1.0	mg/L	10		L107-06-1B	Total/NA
Specific Conductance	1000		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

Detection Summary

Client: Olin Corporation
Project/Site: Olin Chemical Surfacewater

TestAmerica Job ID: 360-37491-1

Client Sample ID: OC-SW-PZ18R-DUP

Lab Sample ID: 360-37491-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	180		100	13	ug/L	1		6010B	Dissolved
Chromium	15		5.0	0.65	ug/L	1		6010B	Dissolved
Sodium	96000		2000	280	ug/L	1		6010B	Dissolved
Aluminum	260		100	13	ug/L	1		6010B	Total/NA
Chromium	21		5.0	0.65	ug/L	1		6010B	Total/NA
Sodium	83000	B	2000	280	ug/L	1		6010B	Total/NA

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Nitrate as N	0.20		0.050	0.050	mg/L	1		300.0	Total/NA
Sulfate	110		20	20	mg/L	10		300.0	Total/NA
Chloride	120		10	10	mg/L	10		300.0	Total/NA
Ammonia	29		1.0	1.0	mg/L	10		L107-06-1B	Total/NA
Specific Conductance	780		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

Method Summary

Client: Olin Corporation
Project/Site: Olin Chemical Surfacewater

TestAmerica Job ID: 360-37491-1

Method	Method Description	Protocol	Laboratory
6010B	Total Metals	SW846	TAL WFD
6010B	Dissolved Metals	SW846	TAL WFD
300.0	Chloride & Sulfate	40CFR136A	TAL WFD
300.0	Nitrate & Nitrite	40CFR136A	TAL WFD
L107-06-1B	Nitrogen Ammonia	LACHAT	TAL WFD
SM 2510B	Conductivity, Specific Conductance	SM	TAL WFD

Protocol References:

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.
LACHAT = LACHAT
SM = "Standard Methods For The Examination Of Water And Wastewater",
SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL WFD = TestAmerica Westfield, Westfield Executive Park, 53 Southampton Road, Westfield, MA 01085, TEL (413)572-4000

Sample Summary

Client: Olin Corporation
Project/Site: Olin Chemical Surfacewater

TestAmerica Job ID: 360-37491-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
360-37491-1	OC-SW-ISC01	Water	11/08/11 12:45	11/08/11 17:10
360-37491-2	OC-SW-ISC02	Water	11/08/11 11:45	11/08/11 17:10
360-37491-3	OC-SW-ISC03	Water	11/08/11 11:30	11/08/11 17:10
360-37491-4	OC-SW-PZ16RR	Water	11/08/11 11:55	11/08/11 17:10
360-37491-5	OC-SW-PZ17RR	Water	11/08/11 12:10	11/08/11 17:10
360-37491-6	OC-SW-PZ18R	Water	11/08/11 12:30	11/08/11 17:10
360-37491-7	OC-SW-SD17	Water	11/08/11 12:20	11/08/11 17:10
360-37491-8	OC-SW-PZ18R-DUP	Water	11/08/11 12:30	11/08/11 17:10

Method: 6010B - Dissolved Metals - Dissolved

Client Sample ID: OC-SW-ISC01
Date Collected: 11/08/11 12:45
Date Received: 11/08/11 17:10

Lab Sample ID: 360-37491-1
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	150		100	13	ug/L			11/15/11 17:05	1
Chromium	13		5.0	0.65	ug/L			11/15/11 17:05	1
Sodium	98000		2000	280	ug/L			11/15/11 17:05	1

Client Sample ID: OC-SW-ISC02
Date Collected: 11/08/11 11:45
Date Received: 11/08/11 17:10

Lab Sample ID: 360-37491-2
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	130		100	13	ug/L			11/15/11 17:08	1
Chromium	27		5.0	0.65	ug/L			11/15/11 17:08	1
Sodium	100000		2000	280	ug/L			11/15/11 17:08	1

Client Sample ID: OC-SW-ISC03
Date Collected: 11/08/11 11:30
Date Received: 11/08/11 17:10

Lab Sample ID: 360-37491-3
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	28	J	100	13	ug/L			11/15/11 17:11	1
Chromium	ND		5.0	0.65	ug/L			11/15/11 17:11	1
Sodium	100000		2000	280	ug/L			11/15/11 17:11	1

Client Sample ID: OC-SW-PZ16RR
Date Collected: 11/08/11 11:55
Date Received: 11/08/11 17:10

Lab Sample ID: 360-37491-4
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	69	J	100	13	ug/L			11/15/11 17:18	1
Chromium	23		5.0	0.65	ug/L			11/15/11 17:18	1
Sodium	130000		2000	280	ug/L			11/15/11 17:18	1

Client Sample ID: OC-SW-PZ17RR
Date Collected: 11/08/11 12:10
Date Received: 11/08/11 17:10

Lab Sample ID: 360-37491-5
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	110		100	13	ug/L			11/15/11 17:21	1
Chromium	55		5.0	0.65	ug/L			11/15/11 17:21	1
Sodium	140000		2000	280	ug/L			11/15/11 17:21	1

Client Sample ID: OC-SW-PZ18R
Date Collected: 11/08/11 12:30
Date Received: 11/08/11 17:10

Lab Sample ID: 360-37491-6
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	170		100	13	ug/L			11/15/11 16:47	1
Chromium	14		5.0	0.65	ug/L			11/15/11 16:47	1
Sodium	96000		2000	280	ug/L			11/15/11 16:47	1

Client: Olin Corporation
Project/Site: Olin Chemical Surfacewater

TestAmerica Job ID: 360-37491-1

Method: 6010B - Dissolved Metals - Dissolved

Client Sample ID: OC-SW-SD17
Date Collected: 11/08/11 12:20
Date Received: 11/08/11 17:10

Lab Sample ID: 360-37491-7
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1900		100	13	ug/L			11/15/11 17:24	1
Chromium	370		5.0	0.65	ug/L			11/15/11 17:24	1
Sodium	140000		2000	280	ug/L			11/15/11 17:24	1

Client Sample ID: OC-SW-PZ18R-DUP
Date Collected: 11/08/11 12:30
Date Received: 11/08/11 17:10

Lab Sample ID: 360-37491-8
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	180		100	13	ug/L			11/15/11 17:26	1
Chromium	15		5.0	0.65	ug/L			11/15/11 17:26	1
Sodium	96000		2000	280	ug/L			11/15/11 17:26	1

Method: 6010B - Total Metals

Client Sample ID: OC-SW-ISC01
Date Collected: 11/08/11 12:45
Date Received: 11/08/11 17:10

Lab Sample ID: 360-37491-1
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	330		100	13	ug/L		11/09/11 11:49	11/11/11 18:17	1
Chromium	30		5.0	0.65	ug/L		11/09/11 11:49	11/11/11 18:17	1
Sodium	89000		2000	280	ug/L		11/09/11 11:49	11/11/11 18:17	1

Client Sample ID: OC-SW-ISC02
Date Collected: 11/08/11 11:45
Date Received: 11/08/11 17:10

Lab Sample ID: 360-37491-2
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	4000		100	13	ug/L		11/09/11 11:49	11/11/11 18:20	1
Chromium	750		5.0	0.65	ug/L		11/09/11 11:49	11/11/11 18:20	1
Sodium	84000		2000	280	ug/L		11/09/11 11:49	11/11/11 18:20	1

Client Sample ID: OC-SW-ISC03
Date Collected: 11/08/11 11:30
Date Received: 11/08/11 17:10

Lab Sample ID: 360-37491-3
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	200		100	13	ug/L		11/09/11 11:49	11/11/11 18:23	1
Chromium	2.0	J	5.0	0.65	ug/L		11/09/11 11:49	11/11/11 18:23	1
Sodium	93000		2000	280	ug/L		11/09/11 11:49	11/11/11 18:23	1

Client Sample ID: OC-SW-PZ16RR
Date Collected: 11/08/11 11:55
Date Received: 11/08/11 17:10

Lab Sample ID: 360-37491-4
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	1800		100	13	ug/L		11/09/11 11:49	11/11/11 18:26	1
Chromium	380		5.0	0.65	ug/L		11/09/11 11:49	11/11/11 18:26	1
Sodium	110000		2000	280	ug/L		11/09/11 11:49	11/11/11 18:26	1

Client Sample ID: OC-SW-PZ17RR
Date Collected: 11/08/11 12:10
Date Received: 11/08/11 17:10

Lab Sample ID: 360-37491-5
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	2000		100	13	ug/L		11/09/11 11:49	11/11/11 18:29	1
Chromium	470		5.0	0.65	ug/L		11/09/11 11:49	11/11/11 18:29	1
Sodium	120000		2000	280	ug/L		11/09/11 11:49	11/11/11 18:29	1

Client Sample ID: OC-SW-PZ18R
Date Collected: 11/08/11 12:30
Date Received: 11/08/11 17:10

Lab Sample ID: 360-37491-6
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	270		100	13	ug/L		11/09/11 11:49	11/11/11 17:57	1
Chromium	22		5.0	0.65	ug/L		11/09/11 11:49	11/11/11 17:57	1
Sodium	88000		2000	280	ug/L		11/09/11 11:49	11/11/11 17:57	1

Client: Olin Corporation
Project/Site: Olin Chemical Surfacewater

TestAmerica Job ID: 360-37491-1

Method: 6010B - Total Metals

Client Sample ID: OC-SW-SD17
Date Collected: 11/08/11 12:20
Date Received: 11/08/11 17:10

Lab Sample ID: 360-37491-7
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	2100		100	13	ug/L		11/10/11 08:48	11/14/11 15:00	1
Chromium	470		5.0	0.65	ug/L		11/10/11 08:48	11/14/11 15:00	1
Sodium	120000	B	2000	280	ug/L		11/10/11 08:48	11/14/11 15:00	1

Client Sample ID: OC-SW-PZ18R-DUP
Date Collected: 11/08/11 12:30
Date Received: 11/08/11 17:10

Lab Sample ID: 360-37491-8
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	260		100	13	ug/L		11/10/11 08:48	11/14/11 14:52	1
Chromium	21		5.0	0.65	ug/L		11/10/11 08:48	11/14/11 14:52	1
Sodium	83000	B	2000	280	ug/L		11/10/11 08:48	11/14/11 14:52	1

General Chemistry

Client Sample ID: OC-SW-ISC01
Date Collected: 11/08/11 12:45
Date Received: 11/08/11 17:10

Lab Sample ID: 360-37491-1
Matrix: Water

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	**0.20**		0.050	0.050	mg/L			11/10/11 00:24	1
Sulfate	**110**		20	20	mg/L			11/10/11 00:37	10
Chloride	**120**		10	10	mg/L			11/10/11 00:37	10
Nitrite as N	ND		0.010	0.010	mg/L			11/10/11 00:24	1
Ammonia	**25**		1.0	1.0	mg/L		11/15/11 14:32	11/16/11 15:18	10
Specific Conductance	**760**		1.0	1.0	umhos/cm			11/12/11 09:52	1

Client Sample ID: OC-SW-ISC02
Date Collected: 11/08/11 11:45
Date Received: 11/08/11 17:10

Lab Sample ID: 360-37491-2
Matrix: Water

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	**1.1**		0.050	0.050	mg/L			11/09/11 20:36	1
Sulfate	**180**		20	20	mg/L			11/09/11 20:52	10
Chloride	**97**		10	10	mg/L			11/09/11 20:52	10
Nitrite as N	ND		0.010	0.010	mg/L			11/09/11 20:36	1
Ammonia	**33**		1.0	1.0	mg/L		11/15/11 14:32	11/16/11 15:19	10
Specific Conductance	**860**		1.0	1.0	umhos/cm			11/12/11 09:53	1

Client Sample ID: OC-SW-ISC03
Date Collected: 11/08/11 11:30
Date Received: 11/08/11 17:10

Lab Sample ID: 360-37491-3
Matrix: Water

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	**1.0**		0.050	0.050	mg/L			11/09/11 20:03	1
Sulfate	**33**		2.0	2.0	mg/L			11/09/11 20:02	1
Chloride	**170**		10	10	mg/L			11/09/11 20:20	10
Nitrite as N	ND		0.10	0.10	mg/L			11/09/11 20:20	10
Ammonia	**1.7**		0.10	0.10	mg/L		11/15/11 14:32	11/16/11 14:57	1
Specific Conductance	**740**		1.0	1.0	umhos/cm			11/12/11 09:54	1

Client Sample ID: OC-SW-PZ16RR
Date Collected: 11/08/11 11:55
Date Received: 11/08/11 17:10

Lab Sample ID: 360-37491-4
Matrix: Water

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	**1.8**		0.050	0.050	mg/L			11/09/11 21:08	1
Sulfate	**160**		20	20	mg/L			11/09/11 21:24	10
Chloride	**120**		10	10	mg/L			11/09/11 21:24	10
Nitrite as N	ND		0.10	0.10	mg/L			11/09/11 21:24	10
Ammonia	**31**		1.0	1.0	mg/L		11/15/11 14:32	11/16/11 15:20	10
Specific Conductance	**950**		1.0	1.0	umhos/cm			11/12/11 09:56	1

Client Sample ID: OC-SW-PZ17RR
Date Collected: 11/08/11 12:10
Date Received: 11/08/11 17:10

Lab Sample ID: 360-37491-5
Matrix: Water

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	**1.8**		0.050	0.050	mg/L			11/09/11 22:44	1

General Chemistry (Continued)

Client Sample ID: OC-SW-PZ17RR
Date Collected: 11/08/11 12:10
Date Received: 11/08/11 17:10

Lab Sample ID: 360-37491-5
Matrix: Water

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	**180**		20	20	mg/L			11/09/11 23:01	10
Chloride	**130**		10	10	mg/L			11/09/11 23:01	10
Nitrite as N	ND		0.10	0.10	mg/L			11/09/11 23:01	10
Ammonia	**33**		1.0	1.0	mg/L		11/15/11 14:32	11/16/11 15:21	10
Specific Conductance	**1000**		1.0	1.0	umhos/cm			11/12/11 09:57	1

Client Sample ID: OC-SW-PZ18R
Date Collected: 11/08/11 12:30
Date Received: 11/08/11 17:10

Lab Sample ID: 360-37491-6
Matrix: Water

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	**0.20**		0.050	0.050	mg/L			11/09/11 23:17	1
Sulfate	**120**		20	20	mg/L			11/09/11 23:33	10
Chloride	**120**		10	10	mg/L			11/09/11 23:33	10
Nitrite as N	ND		0.010	0.010	mg/L			11/09/11 23:17	1
Ammonia	**30**		1.0	1.0	mg/L		11/15/11 14:32	11/16/11 15:15	10
Specific Conductance	**780**		1.0	1.0	umhos/cm			11/12/11 10:03	1

Client Sample ID: OC-SW-SD17
Date Collected: 11/08/11 12:20
Date Received: 11/08/11 17:10

Lab Sample ID: 360-37491-7
Matrix: Water

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	**1.7**		0.050	0.050	mg/L			11/10/11 00:53	1
Sulfate	**190**		20	20	mg/L			11/10/11 01:09	10
Chloride	**130**		10	10	mg/L			11/10/11 01:09	10
Nitrite as N	ND		0.010	0.010	mg/L			11/10/11 00:53	1
Ammonia	**32**		1.0	1.0	mg/L		11/15/11 14:32	11/16/11 15:22	10
Specific Conductance	**1000**		1.0	1.0	umhos/cm			11/12/11 10:06	1

Client Sample ID: OC-SW-PZ18R-DUP
Date Collected: 11/08/11 12:30
Date Received: 11/08/11 17:10

Lab Sample ID: 360-37491-8
Matrix: Water

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	**0.20**		0.050	0.050	mg/L			11/10/11 02:30	1
Sulfate	**110**		20	20	mg/L			11/10/11 02:46	10
Chloride	**120**		10	10	mg/L			11/10/11 02:46	10
Nitrite as N	ND		0.010	0.010	mg/L			11/10/11 02:30	1
Ammonia	**29**		1.0	1.0	mg/L		11/15/11 14:32	11/16/11 15:25	10
Specific Conductance	**780**		1.0	1.0	umhos/cm			11/12/11 10:08	1

Qualifiers

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
4	MS, MSD: The analyte present in the original sample is 4 times greater than the matrix spike concentration; therefore, control limits are not applicable.
B	Compound was found in the blank and sample.

General Chemistry

Qualifier	Qualifier Description
F	MS or MSD exceeds the control limits

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
☼	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CNF	Contains no Free Liquid
DL, RA, RE, IN	Indicates a Dilution, Reanalysis, Re-extraction, or additional Initial metals/anion analysis of the sample
EDL	Estimated Detection Limit
EPA	United States Environmental Protection Agency
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
RL	Reporting Limit
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Metals

Prep Batch: 83100

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37491-1	OC-SW-ISC01	Total/NA	Water	3010A	
360-37491-2	OC-SW-ISC02	Total/NA	Water	3010A	
360-37491-3	OC-SW-ISC03	Total/NA	Water	3010A	
360-37491-4	OC-SW-PZ16RR	Total/NA	Water	3010A	
360-37491-5	OC-SW-PZ17RR	Total/NA	Water	3010A	
360-37491-6	OC-SW-PZ18R	Total/NA	Water	3010A	
360-37491-6MS	OC-SW-PZ18R	Total/NA	Water	3010A	
360-37491-6MSD	OC-SW-PZ18R	Total/NA	Water	3010A	
LCS 360-83100/2-A	Lab Control Sample	Total/NA	Water	3010A	
LCSD 360-83100/3-A	Lab Control Sample Dup	Total/NA	Water	3010A	
MB 360-83100/1-A	Method Blank	Total/NA	Water	3010A	

Prep Batch: 83163

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37491-7	OC-SW-SD17	Total/NA	Water	3010A	
360-37491-8	OC-SW-PZ18R-DUP	Total/NA	Water	3010A	
LCS 360-83163/2-A	Lab Control Sample	Total/NA	Water	3010A	
LCSD 360-83163/3-A	Lab Control Sample Dup	Total/NA	Water	3010A	
MB 360-83163/1-A	Method Blank	Total/NA	Water	3010A	

Analysis Batch: 83303

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37491-1	OC-SW-ISC01	Total/NA	Water	6010B	83100
360-37491-2	OC-SW-ISC02	Total/NA	Water	6010B	83100
360-37491-3	OC-SW-ISC03	Total/NA	Water	6010B	83100
360-37491-4	OC-SW-PZ16RR	Total/NA	Water	6010B	83100
360-37491-5	OC-SW-PZ17RR	Total/NA	Water	6010B	83100
360-37491-6	OC-SW-PZ18R	Total/NA	Water	6010B	83100
360-37491-6MS	OC-SW-PZ18R	Total/NA	Water	6010B	83100
360-37491-6MSD	OC-SW-PZ18R	Total/NA	Water	6010B	83100
LCS 360-83100/2-A	Lab Control Sample	Total/NA	Water	6010B	83100
LCSD 360-83100/3-A	Lab Control Sample Dup	Total/NA	Water	6010B	83100
MB 360-83100/1-A	Method Blank	Total/NA	Water	6010B	83100

Analysis Batch: 83365

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37491-7	OC-SW-SD17	Total/NA	Water	6010B	83163
360-37491-8	OC-SW-PZ18R-DUP	Total/NA	Water	6010B	83163
LCS 360-83163/2-A	Lab Control Sample	Total/NA	Water	6010B	83163
LCSD 360-83163/3-A	Lab Control Sample Dup	Total/NA	Water	6010B	83163
MB 360-83163/1-A	Method Blank	Total/NA	Water	6010B	83163

Analysis Batch: 83420

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37491-1	OC-SW-ISC01	Dissolved	Water	6010B	
360-37491-2	OC-SW-ISC02	Dissolved	Water	6010B	
360-37491-3	OC-SW-ISC03	Dissolved	Water	6010B	
360-37491-4	OC-SW-PZ16RR	Dissolved	Water	6010B	
360-37491-5	OC-SW-PZ17RR	Dissolved	Water	6010B	
360-37491-6	OC-SW-PZ18R	Dissolved	Water	6010B	
360-37491-6MS	OC-SW-PZ18R	Dissolved	Water	6010B	
360-37491-6MSD	OC-SW-PZ18R	Dissolved	Water	6010B	

Metals (Continued)

Analysis Batch: 83420 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37491-7	OC-SW-SD17	Dissolved	Water	6010B	
360-37491-8	OC-SW-PZ18R-DUP	Dissolved	Water	6010B	
LCS 360-83420/1	Lab Control Sample	Total/NA	Water	6010B	
LCSD 360-83420/6	Lab Control Sample Dup	Total/NA	Water	6010B	
MB 360-83420/2	Method Blank	Total/NA	Water	6010B	

General Chemistry

Analysis Batch: 83244

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37491-1	OC-SW-ISC01	Total/NA	Water	300.0	
360-37491-2	OC-SW-ISC02	Total/NA	Water	300.0	
360-37491-3	OC-SW-ISC03	Total/NA	Water	300.0	
360-37491-3	OC-SW-ISC03	Total/NA	Water	300.0	
360-37491-4	OC-SW-PZ16RR	Total/NA	Water	300.0	
360-37491-5	OC-SW-PZ17RR	Total/NA	Water	300.0	
360-37491-6	OC-SW-PZ18R	Total/NA	Water	300.0	
360-37491-6MS	OC-SW-PZ18R	Total/NA	Water	300.0	
360-37491-6MSD	OC-SW-PZ18R	Total/NA	Water	300.0	
360-37491-7	OC-SW-SD17	Total/NA	Water	300.0	
LCS 360-83244/4	Lab Control Sample	Total/NA	Water	300.0	
MB 360-83244/3	Method Blank	Total/NA	Water	300.0	

Analysis Batch: 83246

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37491-8	OC-SW-PZ18R-DUP	Total/NA	Water	300.0	
LCS 360-83246/6	Lab Control Sample	Total/NA	Water	300.0	
MB 360-83246/5	Method Blank	Total/NA	Water	300.0	

Analysis Batch: 83283

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37491-1	OC-SW-ISC01	Total/NA	Water	SM 2510B	
360-37491-2	OC-SW-ISC02	Total/NA	Water	SM 2510B	
360-37491-3	OC-SW-ISC03	Total/NA	Water	SM 2510B	
360-37491-4	OC-SW-PZ16RR	Total/NA	Water	SM 2510B	
360-37491-5	OC-SW-PZ17RR	Total/NA	Water	SM 2510B	
360-37491-6	OC-SW-PZ18R	Total/NA	Water	SM 2510B	
360-37491-6 DU	OC-SW-PZ18R	Total/NA	Water	SM 2510B	
360-37491-7	OC-SW-SD17	Total/NA	Water	SM 2510B	
360-37491-8	OC-SW-PZ18R-DUP	Total/NA	Water	SM 2510B	
LCS 360-83283/1	Lab Control Sample	Total/NA	Water	SM 2510B	
MB 360-83283/3	Method Blank	Total/NA	Water	SM 2510B	

Analysis Batch: 83371

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37491-1	OC-SW-ISC01	Total/NA	Water	300.0	
360-37491-2	OC-SW-ISC02	Total/NA	Water	300.0	
360-37491-3	OC-SW-ISC03	Total/NA	Water	300.0	
360-37491-3	OC-SW-ISC03	Total/NA	Water	300.0	
360-37491-4	OC-SW-PZ16RR	Total/NA	Water	300.0	
360-37491-4	OC-SW-PZ16RR	Total/NA	Water	300.0	
360-37491-5	OC-SW-PZ17RR	Total/NA	Water	300.0	

General Chemistry (Continued)

Analysis Batch: 83371 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37491-5	OC-SW-PZ17RR	Total/NA	Water	300.0	
360-37491-6	OC-SW-PZ18R	Total/NA	Water	300.0	
360-37491-6MS	OC-SW-PZ18R-MS	Total/NA	Water	300.0	
360-37491-6MSD	OC-SW-PZ18R-MSD	Total/NA	Water	300.0	
360-37491-7	OC-SW-SD17	Total/NA	Water	300.0	
LCS 360-83371/4	Lab Control Sample	Total/NA	Water	300.0	
MB 360-83371/3	Method Blank	Total/NA	Water	300.0	

Analysis Batch: 83384

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37491-8	OC-SW-PZ18R-DUP	Total/NA	Water	300.0	
LCS 360-83384/6	Lab Control Sample	Total/NA	Water	300.0	
MB 360-83384/5	Method Blank	Total/NA	Water	300.0	

Prep Batch: 83401

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37491-1	OC-SW-ISC01	Total/NA	Water	Distill/Ammonia	
360-37491-2	OC-SW-ISC02	Total/NA	Water	Distill/Ammonia	
360-37491-3	OC-SW-ISC03	Total/NA	Water	Distill/Ammonia	
360-37491-4	OC-SW-PZ16RR	Total/NA	Water	Distill/Ammonia	
360-37491-5	OC-SW-PZ17RR	Total/NA	Water	Distill/Ammonia	
360-37491-6	OC-SW-PZ18R	Total/NA	Water	Distill/Ammonia	
360-37491-6MS	OC-SW-PZ18R	Total/NA	Water	Distill/Ammonia	
360-37491-6MSD	OC-SW-PZ18R	Total/NA	Water	Distill/Ammonia	
360-37491-7	OC-SW-SD17	Total/NA	Water	Distill/Ammonia	
360-37491-8	OC-SW-PZ18R-DUP	Total/NA	Water	Distill/Ammonia	
LCS 360-83401/2-A	Lab Control Sample	Total/NA	Water	Distill/Ammonia	
MB 360-83401/1-A	Method Blank	Total/NA	Water	Distill/Ammonia	

Analysis Batch: 83489

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37491-1	OC-SW-ISC01	Total/NA	Water	L107-06-1B	83401
360-37491-2	OC-SW-ISC02	Total/NA	Water	L107-06-1B	83401
360-37491-3	OC-SW-ISC03	Total/NA	Water	L107-06-1B	83401
360-37491-4	OC-SW-PZ16RR	Total/NA	Water	L107-06-1B	83401
360-37491-5	OC-SW-PZ17RR	Total/NA	Water	L107-06-1B	83401
360-37491-6	OC-SW-PZ18R	Total/NA	Water	L107-06-1B	83401
360-37491-6MS	OC-SW-PZ18R	Total/NA	Water	L107-06-1B	83401
360-37491-6MSD	OC-SW-PZ18R	Total/NA	Water	L107-06-1B	83401
360-37491-7	OC-SW-SD17	Total/NA	Water	L107-06-1B	83401
360-37491-8	OC-SW-PZ18R-DUP	Total/NA	Water	L107-06-1B	83401
LCS 360-83401/2-A	Lab Control Sample	Total/NA	Water	L107-06-1B	83401
MB 360-83401/1-A	Method Blank	Total/NA	Water	L107-06-1B	83401

Method: 6010B - Total Metals

Lab Sample ID: MB 360-83100/1-A
Matrix: Water
Analysis Batch: 83303

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 83100

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		100	13	ug/L		11/09/11 11:49	11/11/11 17:48	1
Chromium	ND		5.0	0.65	ug/L		11/09/11 11:49	11/11/11 17:48	1
Sodium	ND		2000	280	ug/L		11/09/11 11:49	11/11/11 17:48	1

Lab Sample ID: LCS 360-83100/2-A
Matrix: Water
Analysis Batch: 83303

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 83100

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	5000	5620		ug/L		112	80 - 120
Chromium	1000	1120		ug/L		112	80 - 120
Sodium	20000	20000		ug/L		100	80 - 120

Lab Sample ID: LCSD 360-83100/3-A
Matrix: Water
Analysis Batch: 83303

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 83100

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	5000	5820		ug/L		116	80 - 120	4	20
Chromium	1000	1150		ug/L		115	80 - 120	3	20
Sodium	20000	21400		ug/L		107	80 - 120	7	20

Lab Sample ID: 360-37491-6MS
Matrix: Water
Analysis Batch: 83303

Client Sample ID: OC-SW-PZ18R
Prep Type: Total/NA
Prep Batch: 83100

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	270		5000	6080		ug/L		116	75 - 125
Chromium	22		1000	1170		ug/L		115	75 - 125
Sodium	88000		20000	107000	4	ug/L		90	75 - 125

Lab Sample ID: 360-37491-6MSD
Matrix: Water
Analysis Batch: 83303

Client Sample ID: OC-SW-PZ18R
Prep Type: Total/NA
Prep Batch: 83100

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	270		5000	5940		ug/L		113	75 - 125	2	20
Chromium	22		1000	1140		ug/L		111	75 - 125	3	20
Sodium	88000		20000	105000	4	ug/L		84	75 - 125	1	20

Lab Sample ID: MB 360-83163/1-A
Matrix: Water
Analysis Batch: 83365

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 83163

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		100	13	ug/L		11/10/11 08:48	11/14/11 14:28	1
Chromium	ND		5.0	0.65	ug/L		11/10/11 08:48	11/14/11 14:28	1
Sodium	391	J	2000	280	ug/L		11/10/11 08:48	11/14/11 14:28	1

Method: 6010B - Total Metals (Continued)

Lab Sample ID: LCS 360-83163/2-A
Matrix: Water
Analysis Batch: 83365

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 83163

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	5000	5640		ug/L		113	80 - 120
Chromium	1000	1100		ug/L		110	80 - 120
Sodium	20000	20700		ug/L		103	80 - 120

Lab Sample ID: LCSD 360-83163/3-A
Matrix: Water
Analysis Batch: 83365

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 83163

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	5000	5440		ug/L		109	80 - 120	4	20
Chromium	1000	1060		ug/L		106	80 - 120	4	20
Sodium	20000	20300		ug/L		101	80 - 120	2	20

Method: 6010B - Dissolved Metals

Lab Sample ID: MB 360-83420/2
Matrix: Water
Analysis Batch: 83420

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		100	13	ug/L			11/15/11 16:24	1
Chromium	ND		5.0	0.65	ug/L			11/15/11 16:24	1
Sodium	ND		2000	280	ug/L			11/15/11 16:24	1

Lab Sample ID: LCS 360-83420/1
Matrix: Water
Analysis Batch: 83420

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	5000	5210		ug/L		104	80 - 120
Chromium	1000	1000		ug/L		100	80 - 120
Sodium	20000	19500		ug/L		98	80 - 120

Lab Sample ID: LCSD 360-83420/6
Matrix: Water
Analysis Batch: 83420

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	5000	5190		ug/L		104	80 - 120	0	20
Chromium	1000	999		ug/L		100	80 - 120	0	20
Sodium	20000	19300		ug/L		96	80 - 120	1	20

Lab Sample ID: 360-37491-6MS
Matrix: Water
Analysis Batch: 83420

Client Sample ID: OC-SW-PZ18R
Prep Type: Dissolved

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	170		5000	5420		ug/L		105	75 - 125
Chromium	14		1000	1020		ug/L		100	75 - 125
Sodium	96000		20000	113000	4	ug/L		86	75 - 125

Method: 6010B - Dissolved Metals (Continued)

Lab Sample ID: 360-37491-6MSD
Matrix: Water
Analysis Batch: 83420

Client Sample ID: OC-SW-PZ18R
Prep Type: Dissolved

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	170		5000	5420		ug/L		105	75 - 125	0	20
Chromium	14		1000	1020		ug/L		100	75 - 125	0	20
Sodium	96000		20000	113000	4	ug/L		85	75 - 125	0	20

Method: 300.0 - Nitrate & Nitrite

Lab Sample ID: MB 360-83371/3
Matrix: Water
Analysis Batch: 83371

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	ND		0.050	0.050	mg/L			11/09/11 18:59	1
Nitrite as N	ND		0.010	0.010	mg/L			11/09/11 18:59	1

Lab Sample ID: LCS 360-83371/4
Matrix: Water
Analysis Batch: 83371

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate as N	4.00	3.84		mg/L		96	85 - 115
Nitrite as N	4.00	4.04		mg/L		101	85 - 115

Lab Sample ID: 360-37491-6MS
Matrix: Water
Analysis Batch: 83371

Client Sample ID: OC-SW-PZ18R-MS
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate as N	ND		10.0	10.6		mg/L		106	75 - 125
Nitrite as N	ND		10.0	10.5		mg/L		105	75 - 125

Lab Sample ID: 360-37491-6MSD
Matrix: Water
Analysis Batch: 83371

Client Sample ID: OC-SW-PZ18R-MSD
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Nitrate as N	ND		10.0	10.7		mg/L		107	75 - 125	1	20
Nitrite as N	ND		10.0	10.5		mg/L		105	75 - 125	0	20

Lab Sample ID: MB 360-83384/5
Matrix: Water
Analysis Batch: 83384

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Nitrate as N	ND		0.050	0.050	mg/L			11/10/11 01:58	1
Nitrite as N	ND		0.010	0.010	mg/L			11/10/11 01:58	1

Method: 300.0 - Nitrate & Nitrite (Continued)

Lab Sample ID: LCS 360-83384/6
Matrix: Water
Analysis Batch: 83384

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Nitrate as N	4.00	3.90		mg/L		98	85 - 115
Nitrite as N	4.00	4.08		mg/L		102	85 - 115

Method: 300.0 - Chloride & Sulfate

Lab Sample ID: MB 360-83244/3
Matrix: Water
Analysis Batch: 83244

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	ND		2.0	2.0	mg/L			11/09/11 18:59	1
Chloride	ND		1.0	1.0	mg/L			11/09/11 18:59	1

Lab Sample ID: LCS 360-83244/4
Matrix: Water
Analysis Batch: 83244

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	80.0	81.1		mg/L		101	85 - 115
Chloride	40.0	40.7		mg/L		102	85 - 115

Lab Sample ID: 360-37491-6MS
Matrix: Water
Analysis Batch: 83244

Client Sample ID: OC-SW-PZ18R
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	120		200	349		mg/L		117	75 - 125
Chloride	120		100	239		mg/L		114	75 - 125

Lab Sample ID: 360-37491-6MSD
Matrix: Water
Analysis Batch: 83244

Client Sample ID: OC-SW-PZ18R
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Sulfate	120		200	349		mg/L		117	75 - 125	0	20
Chloride	120		100	239		mg/L		115	75 - 125	0	20

Lab Sample ID: MB 360-83246/5
Matrix: Water
Analysis Batch: 83246

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	ND		2.0	2.0	mg/L			11/10/11 01:58	1
Chloride	ND		1.0	1.0	mg/L			11/10/11 01:58	1

Lab Sample ID: LCS 360-83246/6
Matrix: Water
Analysis Batch: 83246

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	80.0	81.6		mg/L		102	85 - 115

Method: 300.0 - Chloride & Sulfate (Continued)

Lab Sample ID: LCS 360-83246/6
Matrix: Water
Analysis Batch: 83246

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chloride			40.0	40.9		mg/L		102	85 - 115		

Method: L107-06-1B - Nitrogen Ammonia

Lab Sample ID: MB 360-83401/1-A
Matrix: Water
Analysis Batch: 83489

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 83401

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	ND		0.10	0.10	mg/L		11/15/11 14:32	11/16/11 14:50	1

Lab Sample ID: LCS 360-83401/2-A
Matrix: Water
Analysis Batch: 83489

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 83401

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Ammonia			10.0	10.4		mg/L		104	90 - 110		

Lab Sample ID: 360-37491-6MS
Matrix: Water
Analysis Batch: 83489

Client Sample ID: OC-SW-PZ18R
Prep Type: Total/NA
Prep Batch: 83401

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Ammonia	30		10.0	41.5	F	mg/L		119	90 - 110		

Lab Sample ID: 360-37491-6MSD
Matrix: Water
Analysis Batch: 83489

Client Sample ID: OC-SW-PZ18R
Prep Type: Total/NA
Prep Batch: 83401

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Ammonia	30		10.0	41.2	F	mg/L		116	90 - 110	1	20

Method: SM 2510B - Conductivity, Specific Conductance

Lab Sample ID: MB 360-83283/3
Matrix: Water
Analysis Batch: 83283

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	ND		1.0	1.0	umhos/cm			11/12/11 09:43	1

Lab Sample ID: LCS 360-83283/1
Matrix: Water
Analysis Batch: 83283

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Specific Conductance			1410	1410		umhos/cm		100	85 - 115		

Method: SM 2510B - Conductivity, Specific Conductance (Continued)

Lab Sample ID: 360-37491-6 DU
Matrix: Water
Analysis Batch: 83283

Client Sample ID: OC-SW-PZ18R
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Specific Conductance	780			774		umhos/cm				0.1	20

Lab Chronicle

Client: Olin Corporation
Project/Site: Olin Chemical Surfacewater

TestAmerica Job ID: 360-37491-1

Client Sample ID: OC-SW-ISC01

Lab Sample ID: 360-37491-1

Date Collected: 11/08/11 12:45

Matrix: Water

Date Received: 11/08/11 17:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			83100	11/09/11 11:49	OG	TAL WFD
Total/NA	Analysis	6010B		1	83303	11/11/11 18:17	TJS	TAL WFD
Dissolved	Analysis	6010B		1	83420	11/15/11 17:05	TJS	TAL WFD
Total/NA	Analysis	300.0		10	83244	11/10/11 00:37	RWE	TAL WFD
Total/NA	Analysis	SM 2510B		1	83283	11/12/11 09:52	AMS	TAL WFD
Total/NA	Analysis	300.0		1	83371	11/10/11 00:24	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			83401	11/15/11 14:32	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		10	83489	11/16/11 15:18	RWE	TAL WFD

Client Sample ID: OC-SW-ISC02

Lab Sample ID: 360-37491-2

Date Collected: 11/08/11 11:45

Matrix: Water

Date Received: 11/08/11 17:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			83100	11/09/11 11:49	OG	TAL WFD
Total/NA	Analysis	6010B		1	83303	11/11/11 18:20	TJS	TAL WFD
Dissolved	Analysis	6010B		1	83420	11/15/11 17:08	TJS	TAL WFD
Total/NA	Analysis	300.0		10	83244	11/09/11 20:52	RWE	TAL WFD
Total/NA	Analysis	SM 2510B		1	83283	11/12/11 09:53	AMS	TAL WFD
Total/NA	Analysis	300.0		1	83371	11/09/11 20:36	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			83401	11/15/11 14:32	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		10	83489	11/16/11 15:19	RWE	TAL WFD

Client Sample ID: OC-SW-ISC03

Lab Sample ID: 360-37491-3

Date Collected: 11/08/11 11:30

Matrix: Water

Date Received: 11/08/11 17:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			83100	11/09/11 11:49	OG	TAL WFD
Total/NA	Analysis	6010B		1	83303	11/11/11 18:23	TJS	TAL WFD
Dissolved	Analysis	6010B		1	83420	11/15/11 17:11	TJS	TAL WFD
Total/NA	Analysis	300.0		1	83244	11/09/11 20:02	RWE	TAL WFD
Total/NA	Analysis	300.0		10	83244	11/09/11 20:20	RWE	TAL WFD
Total/NA	Analysis	SM 2510B		1	83283	11/12/11 09:54	AMS	TAL WFD
Total/NA	Analysis	300.0		1	83371	11/09/11 20:03	RWE	TAL WFD
Total/NA	Analysis	300.0		10	83371	11/09/11 20:20	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			83401	11/15/11 14:32	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		1	83489	11/16/11 14:57	RWE	TAL WFD

Lab Chronicle

Client: Olin Corporation
Project/Site: Olin Chemical Surfacewater

TestAmerica Job ID: 360-37491-1

Client Sample ID: OC-SW-PZ16RR

Lab Sample ID: 360-37491-4

Date Collected: 11/08/11 11:55
Matrix: Water
Date Received: 11/08/11 17:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			83100	11/09/11 11:49	OG	TAL WFD
Total/NA	Analysis	6010B		1	83303	11/11/11 18:26	TJS	TAL WFD
Dissolved	Analysis	6010B		1	83420	11/15/11 17:18	TJS	TAL WFD
Total/NA	Analysis	300.0		10	83244	11/09/11 21:24	RWE	TAL WFD
Total/NA	Analysis	SM 2510B		1	83283	11/12/11 09:56	AMS	TAL WFD
Total/NA	Analysis	300.0		10	83371	11/09/11 21:24	RWE	TAL WFD
Total/NA	Analysis	300.0		1	83371	11/09/11 21:08	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			83401	11/15/11 14:32	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		10	83489	11/16/11 15:20	RWE	TAL WFD

Client Sample ID: OC-SW-PZ17RR

Lab Sample ID: 360-37491-5

Date Collected: 11/08/11 12:10
Matrix: Water
Date Received: 11/08/11 17:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			83100	11/09/11 11:49	OG	TAL WFD
Total/NA	Analysis	6010B		1	83303	11/11/11 18:29	TJS	TAL WFD
Dissolved	Analysis	6010B		1	83420	11/15/11 17:21	TJS	TAL WFD
Total/NA	Analysis	300.0		10	83244	11/09/11 23:01	RWE	TAL WFD
Total/NA	Analysis	SM 2510B		1	83283	11/12/11 09:57	AMS	TAL WFD
Total/NA	Analysis	300.0		1	83371	11/09/11 22:44	RWE	TAL WFD
Total/NA	Analysis	300.0		10	83371	11/09/11 23:01	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			83401	11/15/11 14:32	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		10	83489	11/16/11 15:21	RWE	TAL WFD

Client Sample ID: OC-SW-PZ18R

Lab Sample ID: 360-37491-6

Date Collected: 11/08/11 12:30
Matrix: Water
Date Received: 11/08/11 17:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			83100	11/09/11 11:49	OG	TAL WFD
Total/NA	Analysis	6010B		1	83303	11/11/11 17:57	TJS	TAL WFD
Dissolved	Analysis	6010B		1	83420	11/15/11 16:47	TJS	TAL WFD
Total/NA	Analysis	300.0		10	83244	11/09/11 23:33	RWE	TAL WFD
Total/NA	Analysis	SM 2510B		1	83283	11/12/11 10:03	AMS	TAL WFD
Total/NA	Analysis	300.0		1	83371	11/09/11 23:17	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			83401	11/15/11 14:32	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		10	83489	11/16/11 15:15	RWE	TAL WFD

Lab Chronicle

Client: Olin Corporation
Project/Site: Olin Chemical Surfacewater

TestAmerica Job ID: 360-37491-1

Client Sample ID: OC-SW-SD17

Lab Sample ID: 360-37491-7

Date Collected: 11/08/11 12:20
Matrix: Water
Date Received: 11/08/11 17:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			83163	11/10/11 08:48	OG	TAL WFD
Total/NA	Analysis	6010B		1	83365	11/14/11 15:00	TJS	TAL WFD
Dissolved	Analysis	6010B		1	83420	11/15/11 17:24	TJS	TAL WFD
Total/NA	Analysis	300.0		10	83244	11/10/11 01:09	RWE	TAL WFD
Total/NA	Analysis	SM 2510B		1	83283	11/12/11 10:06	AMS	TAL WFD
Total/NA	Analysis	300.0		1	83371	11/10/11 00:53	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			83401	11/15/11 14:32	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		10	83489	11/16/11 15:22	RWE	TAL WFD

Client Sample ID: OC-SW-PZ18R-DUP

Lab Sample ID: 360-37491-8

Date Collected: 11/08/11 12:30
Matrix: Water
Date Received: 11/08/11 17:10

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3010A			83163	11/10/11 08:48	OG	TAL WFD
Total/NA	Analysis	6010B		1	83365	11/14/11 14:52	TJS	TAL WFD
Dissolved	Analysis	6010B		1	83420	11/15/11 17:26	TJS	TAL WFD
Total/NA	Analysis	300.0		10	83246	11/10/11 02:46	RWE	TAL WFD
Total/NA	Analysis	SM 2510B		1	83283	11/12/11 10:08	AMS	TAL WFD
Total/NA	Analysis	300.0		1	83384	11/10/11 02:30	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			83401	11/15/11 14:32	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		10	83489	11/16/11 15:25	RWE	TAL WFD

Laboratory References:

TAL WFD = TestAmerica Westfield, Westfield Executive Park, 53 Southampton Road, Westfield, MA 01085, TEL (413)572-4000

Certification Summary

Client: Olin Corporation
Project/Site: Olin Chemical Surfacewater

TestAmerica Job ID: 360-37491-1

Laboratory	Authority	Program	EPA Region	Certification ID
TestAmerica Westfield	Connecticut	State Program	1	PH-0494
TestAmerica Westfield	Maine	State Program	1	MA00014
TestAmerica Westfield	Massachusetts	State Program	1	M-MA014
TestAmerica Westfield	New Hampshire	NELAC	1	2539
TestAmerica Westfield	New York	NELAC	2	10843
TestAmerica Westfield	North Carolina	North Carolina DENR	4	647
TestAmerica Westfield	Rhode Island	State Program	1	LAO00057
TestAmerica Westfield	Vermont	State Program	1	VT-10843

Accreditation may not be offered or required for all methods and analytes reported in this package. Please contact your project manager for the laboratory's current list of certified methods and analytes.

State Accreditation Matrix

Method Name	Description	State where **Primary** Accreditation is Carried			
		New Hampshire (NELAC)	Mass	Conn	North Carolina
821-R-02-012	Toxicity, Acute (48-Hour)(list upon request)	NP			
SM 4500 Cl F	Chlorine, Residual		NP		
SM 9215E	Heterotrophic Plate Count (SimPlate)		P		
SM 9222D	Coliforms, Fecal (Membrane Filter)		P/NP		
SM 9223	Coliforms, Total, and E.Coli (Colilert-P/A)		P		
SM 9224	Coliforms, Total, and E.Coli (Enumeration)		P		
1103.1	E.coli		ambient/ source		
Enterolert	Enterococcus				
200.8 Rev 5.4	Metals (ICP/MS) (list upon request)	NP/P	NP/P		
200.7 Rev 4.4	Metals (ICP)(list upon request)	NP/P	NP/P		
6010B	Metals (ICP)(list upon request)	NP/SW			
245.1	Mercury (CVAA)	NP/P	NP		
7470A	Mercury (CVAA)	NP			
7471A	Mercury (CVAA)	SW			
SM 2340B	Total Hardness (as CaCO3) by calculation	NP/P	NP		
3005A	Preparation, Total Recoverable or Dissolved Metals	NP/P			
3010A	Preparation, Total Metals	NP/P			
3020A	Preparation, Total Metals	NP/P/SW			
3050B	Preparation, Metals	SW			
504.1	EDB, DBCP and 1,2,3-TCP (GC)	P	P		
608	Organochlorine Pest/PCBs (list upon request)	NP	NP		
625	Semivolatile Org Comp (GC/MS)(list upon request)	NP	NP		
3546	Microwave Extraction	SW			
3510C	Liquid-Liquid Extraction (Separatory Funnel)	NP			
3550B	Ultrasonic Extraction	SW			
8081A	Organochlorine Pesticides (GC)(list upon request)	NP/SW			
8082	PCBs by Gas Chromatography(list upon request)	NP/SW			
8270C	Semivolatile Comp.(GC/MS)(list upon request)	NP/SW			
CT ETPH	Conn - Ext. Total petroleum Hydrocarbons (GC)			NP/SW	
MA-EPH	Mass - Extractable Petroleum Hydrocarbons (GC)				NP/SW
524.2	Volatile Org Comp (GC/MS)(list upon request)	P	P		
524.2	Trihalomethane compounds	P	P		
624	Volatile Org Comp (GC/MS)(list upon request)	NP	NP		
5035	Closed System Purge and Trap	SW			
5030B	Purge and Trap	NP			
8260B	Volatile Org Comp. (GC/MS)(list upon request)	NP/SW			
MAVPH	Mass - Volatile Petroleum Hydrocarbons (GC)				NP/SW
180.1	Turbidity, Nephelometric	P	P		
300	Anions, Ion Chromatography	NP/P	NP/P		
410.4	COD	NP	NP		
1010	Ignitability, Pensky-Martens Closed-Cup Method	SW			
10-107-06-2	Nitrogen, Total Kjeldahl	NP	NP		
7196A	Chromium, Hexavalent	NP/SW			
9012A	Cyanide, Total and/or Amenable	NP/SW			
9030B	Sulfide, Distillation (Acid Soluble and Insoluble)	NP			
9045C	pH	SW			
L107041C	Nitrogen, Nitrate	NP	P		
L107-06-1B	Nitrogen Ammonia	NP	NP		
L204001A CN	Cyanide, Total	P	NP/P		
L210-001A	Phenolics, Total Recoverable	NP	NP		
SM 2320B	Alkalinity	NP/P	NP/P		
SM 2510B	Conductivity, Specific Conductance	NP/P	NP/P		
SM 2540C	Solids, Total Dissolved (TDS)	NP/P	NP/P		
SM 2540D	Solids, Total Suspended (TSS)	NP	NP		
SM 3500 CR D	Chromium, Hexavalent	NP			
SM 4500 H+ B	pH	NP/P	NP/P		
SM 4500 NO2 B	Nitrogen, Nitrite	NP	P		
SM 4500 P E	Phosphorus, Orthophosphate	NP/P	NP		
SM 4500 P E	Phosphorus, Total	NP	NP		
SM 4500 S2 D	Sulfide, Total	NP			
SM 5210B	BOD, 5-Day	NP	NP		
SM 5310B	Organic Carbon, Total (TOC)	NP/P	NP		

Not all organic compounds are accreditied under NELAC
For methods with multiple compounds all compounds may not meet NELAC criteria, listing should be obtained from the laboratory
The lab carries additional accreditations with several states. This is the laboratories typcial listing but is subject to change based on the laboratories current certification standing.

Login Sample Receipt Checklist

Client: Olin Corporation

Job Number: 360-37491-1

Login Number: 37491

List Source: TestAmerica Westfield

List Number: 1

Creator: Ard, Vanessa L

Question	Answer	Comment
Radioactivity either was not measured or, if measured, is at or below background	N/A	
The cooler's custody seal, if present, is intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica Westfield

Analytical Dilution Preparation Log

Date: 11-9-11

Analyst Initials	Date	Method	LIMs Sample ID	Rpt'd Dil.	Sample Aliquot 1	Units	Final Volume 1	Units	Serial Dilution				Comments
									Sample Aliquot 2	Units	Final Volume 2	Units	
RWE	11-9-11	300.0	374491 D3	10 X	1	mL	10	mL					
		↓	D2	↓	↓	↓	↓	↓					
			D4										
			D5										
			D6										
			D1										
			D7										
↓	↓	↓	↓ D8	↓	↓	↓	↓	↓					

entries completed by day [new page each day]

TestAmerica Westfield

Analytical Dilution Preparation Log

Date: 11-9-11

Analyst Initials	Date	Method	LIMs Sample ID	Rpt'd Dil.	Sample Aliquot 1	Units	Final Volume 1	Units	Serial Dilution				Comments
									Sample Aliquot 2	Units	Final Volume 2	Units	
RWE	11-9-11	300.0	374491 D3	10X	1	mL	10	mL					
↓	↓	↓	↓ D2	↓	↓	↓	↓	↓					
			D4										
			D5										
			D6										
			D1										
			D7										
↓	↓	↓	↓ D8	↓	↓	↓	↓	↓					
RWE	↓	↓	374487 B5	10X	1	mL	10	mL					
↓	↓	↓	↓ C8	5X	2	mL	10	mL					

entries completed by day [new page each day]

11/28/2011

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0479

TestAmerica Westfield
Westfield Executive Park 53 Southampton Road
Westfield, MA 01085
Phone (413) 572-4000 Fax (413) 572-3707

SW

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Brian C. / Chris M	Lab PM: Becky Mason	Carrier Tracking No(s):	COC No: 017504
Client Contact: James Cashwell	Phone:	E-Mail:		Page:
Company: Olin Corporation				Job #:
Address: 51 Eames St	Due Date Requested:			
City: Wilmington	TAT Requested (days): Standard			
State, Zip: MA 01887				
Phone:	Quote #:			
Email:	PO #:			
Project Name/number: Olin Surface Water	WO #:			
Site: Olin Wilmington MA	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL; B - NaOH; C - Zn Acetate; D - Nitric Acid; E - NaHSO4; F - MeOH; H - Ascorbic Acid; I - Ice; J - DI Water; M - Hexane; N - None; P - Na2O4S; Q - Na2SO3; R - Na2S2SO3; S - H2SO4; Z - other (specify)

Regulatory programs: MCP ☐ GW1/S1 ☐ RCP ☐ CT RSR ☐ DEP Form ☐ EDD Required ☐

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Sampler's Initials	Field Filtered Sample?	Perform MS/MSD?	Ammonia Leach 6010B Al/Cr/Na Field Filtered	Sp Cond/Soy Cl/Mn/Mo 6010B Total Al/Cr/Na	Total Number of containers	Special Instructions/Note:
Preservation Code:								S	O N O		48 hr Hold
OC-SW-ISCO1	11/8/11	1245	G	SW	CM	Y	-	X	X X X	4	Nitrate / Nitrite
OC-SW-ISCO2		1145			CM	Y	-	X	X X X	4	
OC-SW-ISCO3		1130			CM	Y	-	X	X X X	4	
OC-SW-PZ16RR		1155			CM	Y	-	X	X X X	4	
OC-SW-PZ17RR		1210			CM	Y	-	X	X X X	4	
OC-SW-PZ18R		1230			CM	Y	Y	X	X X X	4	
OC-SW-SD17		1220			CM	Y	-	X	X X X	4	
OC-SW-PZ18R-DUP		1230			CM	Y	Y	X	X X X	4	
OC-SW-PZ18R-MS		1230			CM	Y	Y	X	X X X	4	
OC-SW-PZ18R-MSD		1230			CM	Y	Y	X	X X X	4	

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	11/8/11 1515	AMEC		11/8/11 1515	
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	11/8/11 1710			11/9/11 1410	
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks: 5.0/6.0 / 4.0/4.0

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FILE COPY

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Westfield
Westfield Executive Park
53 Southampton Road
Westfield, MA 01085
Tel: (413)572-4000

CHECKED FOR COMPLETENESS OF PARAMETERS ORDERED BY:

TestAmerica Job ID: 360-37526-1
Client Project/Site: Olin Chemical Semiannual

For:
Olin Corporation
PO BOX 248
Charleston, Tennessee 37310-0248

Attn: Mr. James Cashwell

Authorized for release by:
12/2/2011 1:54:35 PM
Chris Reynolds
QA Manager
chris.reynolds@testamericainc.com

Designee for

Becky Mason
Project Manager II
becky.mason@testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Client: Olin Corporation
Project/Site: Olin Chemical Semiannual

TestAmerica Job ID: 360-37526-1

Job ID: 360-37526-1

Laboratory: TestAmerica Westfield

Narrative

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

RECEIPT

The samples were received on 11/10/2011; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 0.8 C.

Note: All samples that require thermal preservation are considered acceptable if the arrival temperature is within the method's specified temperature range or for general analysis, ranging from 6°C to just above the freezing temperature of water. Samples that are hand delivered, immediately following collection, may not meet these criteria; however, they will be considered acceptable according to NELAC and State standards, if there is evidence that the chilling process has begun, such as stored and transported to the laboratory on ice.

DISSOLVED METALS

Samples OC-GW-78S (360-37526-1), OC-GW-35S (360-37526-2), OC-GW-201S (360-37526-3), OC-GW-201S-DUP (360-37526-4), OC-GW-79S (360-37526-5), OC-PZ-16RR (360-37526-6), OC-PZ-17RR (360-37526-7) and OC-PZ-18R (360-37526-8) were analyzed for dissolved metals in accordance with EPA SW-846 Method 6010B. The samples were analyzed on 11/15/2011.

Per client request an abbreviated/modified MCP compound list was reported.

No difficulties were encountered during the dissolved metals analyses.

All quality control parameters were within the acceptance limits.

SPECIFIC CONDUCTIVITY

Samples OC-GW-78S (360-37526-1), OC-GW-35S (360-37526-2), OC-GW-201S (360-37526-3), OC-GW-201S-DUP (360-37526-4), OC-GW-79S (360-37526-5), OC-PZ-16RR (360-37526-6), OC-PZ-17RR (360-37526-7) and OC-PZ-18R (360-37526-8) were analyzed for specific conductivity in accordance with SM20 2510B. The samples were analyzed on 11/12/2011 and 11/19/2011.

No difficulties were encountered during the conductivity analyses.

All quality control parameters were within the acceptance limits.

ANIONS (28 DAY HOLD TIME)

Samples OC-GW-78S (360-37526-1), OC-GW-35S (360-37526-2), OC-GW-201S (360-37526-3), OC-GW-201S-DUP (360-37526-4), OC-GW-79S (360-37526-5), OC-PZ-16RR (360-37526-6), OC-PZ-17RR (360-37526-7) and OC-PZ-18R (360-37526-8) were analyzed for anions (28 day hold time) in accordance with EPA Method 300.0. The samples were analyzed on 11/19/2011, 11/24/2011, 11/28/2011, 11/29/2011 and 12/01/2011.

Sulfate failed the recovery criteria low for the MSD of sample OC-GW-201SMSD (360-37526-3) in batch 360-84080.

Refer to the QC report for details.

Samples OC-GW-78S (360-37526-1)[10X], OC-GW-35S (360-37526-2)[10X], OC-GW-201S (360-37526-3)[10X], OC-GW-201S (360-37526-3)[20X], OC-GW-201S-DUP (360-37526-4)[10X], OC-GW-201S-DUP (360-37526-4)[20X], OC-GW-79S (360-37526-5)[10X], OC-GW-79S (360-37526-5)[20X], OC-PZ-16RR (360-37526-6)[10X], OC-PZ-16RR (360-37526-6)[20X], OC-PZ-17RR (360-37526-7)[10X] and OC-PZ-18R (360-37526-8)[10X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

Job ID: 360-37526-1 (Continued)

Laboratory: TestAmerica Westfield (Continued)

No other difficulties were encountered during the anions analyses.

All other quality control parameters were within the acceptance limits.

AMMONIA

Samples OC-GW-78S (360-37526-1), OC-GW-35S (360-37526-2), OC-GW-201S (360-37526-3), OC-GW-201S-DUP (360-37526-4), OC-GW-79S (360-37526-5), OC-PZ-16RR (360-37526-6), OC-PZ-17RR (360-37526-7) and OC-PZ-18R (360-37526-8) were analyzed for ammonia in accordance with Lachat 107-06-1B. The samples were prepared on 11/22/2011 and 11/23/2011 and analyzed on 11/23/2011.

Ammonia failed the recovery criteria high for the MS of sample OC-GW-201SMS (360-37526-3) in batch 360-83912.

Ammonia failed the recovery criteria high for the MSD of sample OC-PZ-18RMSD (360-37526-8) in batch 360-83913. The presence of the '4' qualifier in the report indicates analytes where the concentration in the unspiked sample exceeded four times the spiking amount.

Refer to the QC report for details.

Samples OC-GW-78S (360-37526-1)[10X], OC-GW-35S (360-37526-2)[10X], OC-GW-201S (360-37526-3)[10X], OC-GW-201S-DUP (360-37526-4)[10X], OC-GW-79S (360-37526-5)[10X], OC-PZ-16RR (360-37526-6)[50X], OC-PZ-17RR (360-37526-7)[10X] and OC-PZ-18R (360-37526-8)[10X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No other difficulties were encountered during the ammonia analyses.

All other quality control parameters were within the acceptance limits.

MassDEP Analytical Protocol Certification Form

Laboratory Name: **TestAmerica Westfield** Project #: **360-37526-1**

Project Location: **Wilmington MA** RTN:

This form provides certifications for the following data set: list Laboratory Sample ID Number(s):

360-37526-1[1-8]

Matrices: [X] Groundwater/Surface Water [ ] Soil/Sediment [ ] Drinking Water [ ] Air [ ] Other:

CAM Protocols (check all that apply below):

8260 VOC CAM II A [ ]	7470/7471 Hg CAM III B [ ]	Mass DEP VPH CAM IV A [ ]	8081 Pesticides CAM V B [ ]	7196 Hex Cr CAM VI B [ ]	Mass DEP APH CAM IX A [ ]
8270 SVOC CAM II B [ ]	7010 Metals CAM III C [ ]	Mass DEP EPH CAM IV B [ ]	8151 Herbicides CAM V C [ ]	8330 Explosives CAM VIII A [ ]	TO-15 VOC CAM IX B [ ]
6010 Metals CAM III A [X]	6020 Metals CAM III D [ ]	8082 PCB CAM V A [ ]	9014 Total Cyanide/PAC CAM VI A [ ]	332.0 Perchlorate CAM VIII B [ ]	

Affirmative Responses to Questions A through F are required for "Presumptive Certainty" status

A	Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding time.	[X] Yes [ ] No
B	Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed?	[X] Yes [ ] No
C	Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances?	[X] Yes [ ] No
D	Does the laboratory report comply with all the reporting requirements specified in CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	[X] Yes [ ] No
E	a. VPH, EPH and APH Methods only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications). b. APH and TO-15 Methods only: Was the complete analyte list reported for each method?	[ ] Yes [ ] No [ ] Yes [ ] No
F	Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to Questions A through E)?	[X] Yes [ ] No

Responses to Questions G, H and I below are required for "Presumptive Certainty" status

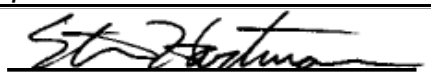
G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)?	[X] Yes [ ] No[1]

***Data User Note:* Data that achieve "Presumptive Certainty" status may not necessarily meet the data usability and representativeness requirements described in 310 CMR 40. 1056 (2)(k) and WCS-07-350**

H	Were **all** QC performance standards specified in the CAM protocol(s) achieved?	[X] Yes [ ] No
I	Were results reported for the complete analyte list specified in the selected CAM protocol(s) ?	[ ] Yes [X] No

[1] All negative responses must be addressed in an attached laboratory narrative.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, is accurate and complete.

Signature:  Position: Laboratory Director

Printed Name: Steven C. Hartmann Date: 12/2/11 13:34

This form has been electronically signed and approved

Detection Summary

Client: Olin Corporation
Project/Site: Olin Chemical Semiannual

TestAmerica Job ID: 360-37526-1

Client Sample ID: OC-GW-78S — Lab Sample ID: 360-37526-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chromium	2.6	J	5.0	0.65	ug/L	1		6010B	Dissolved

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	450		20	20	mg/L	10		300.0	Total/NA
Chloride	27		1.0	1.0	mg/L	1		300.0	Total/NA
Ammonia	52		1.0	1.0	mg/L	10		L107-06-1B	Total/NA
Specific Conductance	1300		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

Client Sample ID: OC-GW-35S — Lab Sample ID: 360-37526-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	26	J	100	13	ug/L	1		6010B	Dissolved
Chromium	21		5.0	0.65	ug/L	1		6010B	Dissolved

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	200		20	20	mg/L	10		300.0	Total/NA
Chloride	6.7		1.0	1.0	mg/L	1		300.0	Total/NA
Ammonia	37		1.0	1.0	mg/L	10		L107-06-1B	Total/NA
Specific Conductance	1000		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

Client Sample ID: OC-GW-201S — Lab Sample ID: 360-37526-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chromium	16		5.0	0.65	ug/L	1		6010B	Dissolved

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	1400		40	40	mg/L	20		300.0	Total/NA
Chloride	77		10	10	mg/L	10		300.0	Total/NA
Ammonia	180		1.0	1.0	mg/L	10		L107-06-1B	Total/NA
Specific Conductance	3100		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

Client Sample ID: OC-GW-201S-DUP — Lab Sample ID: 360-37526-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chromium	16		5.0	0.65	ug/L	1		6010B	Dissolved

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	1300		40	40	mg/L	20		300.0	Total/NA
Chloride	81		10	10	mg/L	10		300.0	Total/NA
Ammonia	150		1.0	1.0	mg/L	10		L107-06-1B	Total/NA
Specific Conductance	3100		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

Client Sample ID: OC-GW-79S — Lab Sample ID: 360-37526-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	13	J	100	13	ug/L	1		6010B	Dissolved
Chromium	9.0		5.0	0.65	ug/L	1		6010B	Dissolved

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	1200		40	40	mg/L	20		300.0	Total/NA
Chloride	140		10	10	mg/L	10		300.0	Total/NA
Ammonia	110		1.0	1.0	mg/L	10		L107-06-1B	Total/NA
Specific Conductance	2800		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

Client Sample ID: OC-PZ-16RR — Lab Sample ID: 360-37526-6

Client Sample ID: OC-PZ-16RR (Continued) — Lab Sample ID: 360-37526-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chromium	7.2		5.0	0.65	ug/L	1		6010B	Dissolved

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	1100		40	40	mg/L	20		300.0	Total/NA
Chloride	170		10	10	mg/L	10		300.0	Total/NA
Ammonia	250		5.0	5.0	mg/L	50		L107-06-1B	Total/NA
Specific Conductance	3000		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

Client Sample ID: OC-PZ-17RR — Lab Sample ID: 360-37526-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chromium	7.3		5.0	0.65	ug/L	1		6010B	Dissolved

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	400		20	20	mg/L	10		300.0	Total/NA
Chloride	24		1.0	1.0	mg/L	1		300.0	Total/NA
Ammonia	48		1.0	1.0	mg/L	10		L107-06-1B	Total/NA
Specific Conductance	1300		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

Client Sample ID: OC-PZ-18R — Lab Sample ID: 360-37526-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chromium	11		5.0	0.65	ug/L	1		6010B	Dissolved

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	200		20	20	mg/L	10		300.0	Total/NA
Chloride	150		10	10	mg/L	10		300.0	Total/NA
Ammonia	62		1.0	1.0	mg/L	10		L107-06-1B	Total/NA
Specific Conductance	1200		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

Method Summary

Client: Olin Corporation
Project/Site: Olin Chemical Semiannual

TestAmerica Job ID: 360-37526-1

Method	Method Description	Protocol	Laboratory
6010B	Dissolved Metals	SW846	TAL WFD
300.0	Chloride & Sulfate	40CFR136A	TAL WFD
L107-06-1B	Nitrogen Ammonia	LACHAT	TAL WFD
SM 2510B	Conductivity, Specific Conductance	SM	TAL WFD

Protocol References:

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.
LACHAT = LACHAT

SM = "Standard Methods For The Examination Of Water And Wastewater",

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL WFD = TestAmerica Westfield, Westfield Executive Park, 53 Southampton Road, Westfield, MA 01085, TEL (413)572-4000

Sample Summary

Client: Olin Corporation
Project/Site: Olin Chemical Semiannual

TestAmerica Job ID: 360-37526-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
360-37526-1	OC-GW-78S	Water	11/09/11 11:40	11/10/11 18:20
360-37526-2	OC-GW-35S	Water	11/09/11 14:05	11/10/11 18:20
360-37526-3	OC-GW-201S	Water	11/09/11 09:20	11/10/11 18:20
360-37526-4	OC-GW-201S-DUP	Water	11/09/11 09:20	11/10/11 18:20
360-37526-5	OC-GW-79S	Water	11/09/11 10:20	11/10/11 18:20
360-37526-6	OC-PZ-16RR	Water	11/09/11 10:30	11/10/11 18:20
360-37526-7	OC-PZ-17RR	Water	11/09/11 12:00	11/10/11 18:20
360-37526-8	OC-PZ-18R	Water	11/09/11 12:55	11/10/11 18:20

Method: 6010B - Dissolved Metals - Dissolved

Client Sample ID: OC-GW-78S
Date Collected: 11/09/11 11:40
Date Received: 11/10/11 18:20

Lab Sample ID: 360-37526-1
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		100	13	ug/L			11/15/11 17:47	1
Chromium	**2.6**	**J**	5.0	0.65	ug/L			11/15/11 17:47	1

Client Sample ID: OC-GW-35S
Date Collected: 11/09/11 14:05
Date Received: 11/10/11 18:20

Lab Sample ID: 360-37526-2
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**26**	**J**	100	13	ug/L			11/15/11 17:50	1
Chromium	**21**		5.0	0.65	ug/L			11/15/11 17:50	1

Client Sample ID: OC-GW-201S
Date Collected: 11/09/11 09:20
Date Received: 11/10/11 18:20

Lab Sample ID: 360-37526-3
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		100	13	ug/L			11/15/11 17:29	1
Chromium	**16**		5.0	0.65	ug/L			11/15/11 17:29	1

Client Sample ID: OC-GW-201S-DUP
Date Collected: 11/09/11 09:20
Date Received: 11/10/11 18:20

Lab Sample ID: 360-37526-4
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		100	13	ug/L			11/15/11 17:53	1
Chromium	**16**		5.0	0.65	ug/L			11/15/11 17:53	1

Client Sample ID: OC-GW-79S
Date Collected: 11/09/11 10:20
Date Received: 11/10/11 18:20

Lab Sample ID: 360-37526-5
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**13**	**J**	100	13	ug/L			11/15/11 17:56	1
Chromium	**9.0**		5.0	0.65	ug/L			11/15/11 17:56	1

Client Sample ID: OC-PZ-16RR
Date Collected: 11/09/11 10:30
Date Received: 11/10/11 18:20

Lab Sample ID: 360-37526-6
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		100	13	ug/L			11/15/11 17:59	1
Chromium	**7.2**		5.0	0.65	ug/L			11/15/11 17:59	1

Client Sample ID: OC-PZ-17RR
Date Collected: 11/09/11 12:00
Date Received: 11/10/11 18:20

Lab Sample ID: 360-37526-7
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		100	13	ug/L			11/15/11 18:02	1

Method: 6010B - Dissolved Metals - Dissolved (Continued)

Client Sample ID: OC-PZ-17RR
Date Collected: 11/09/11 12:00
Date Received: 11/10/11 18:20

Lab Sample ID: 360-37526-7
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	**7.3**		5.0	0.65	ug/L			11/15/11 18:02	1

Client Sample ID: OC-PZ-18R
Date Collected: 11/09/11 12:55
Date Received: 11/10/11 18:20

Lab Sample ID: 360-37526-8
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		100	13	ug/L			11/15/11 18:05	1
Chromium	**11**		5.0	0.65	ug/L			11/15/11 18:05	1

General Chemistry

Client Sample ID: OC-GW-78S
Date Collected: 11/09/11 11:40
Date Received: 11/10/11 18:20

Lab Sample ID: 360-37526-1
Matrix: Water

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	450		20	20	mg/L			11/29/11 00:03	10
Chloride	27		1.0	1.0	mg/L			11/19/11 20:20	1
Ammonia	52		1.0	1.0	mg/L		11/22/11 11:45	11/23/11 14:52	10
Specific Conductance	1300		1.0	1.0	umhos/cm			11/12/11 10:09	1

Client Sample ID: OC-GW-35S
Date Collected: 11/09/11 14:05
Date Received: 11/10/11 18:20

Lab Sample ID: 360-37526-2
Matrix: Water

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	200		20	20	mg/L			11/29/11 00:19	10
Chloride	6.7		1.0	1.0	mg/L			11/19/11 20:36	1
Ammonia	37		1.0	1.0	mg/L		11/22/11 11:45	11/23/11 14:53	10
Specific Conductance	1000		1.0	1.0	umhos/cm			11/12/11 10:10	1

Client Sample ID: OC-GW-201S
Date Collected: 11/09/11 09:20
Date Received: 11/10/11 18:20

Lab Sample ID: 360-37526-3
Matrix: Water

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	1400		40	40	mg/L			11/28/11 20:49	20
Chloride	77		10	10	mg/L			11/19/11 11:44	10
Ammonia	180		1.0	1.0	mg/L		11/22/11 11:45	11/23/11 14:48	10
Specific Conductance	3100		1.0	1.0	umhos/cm			11/19/11 08:20	1

Client Sample ID: OC-GW-201S-DUP
Date Collected: 11/09/11 09:20
Date Received: 11/10/11 18:20

Lab Sample ID: 360-37526-4
Matrix: Water

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	1300		40	40	mg/L			11/28/11 23:14	20
Chloride	81		10	10	mg/L			11/28/11 22:58	10
Ammonia	150		1.0	1.0	mg/L		11/22/11 11:45	11/23/11 14:54	10
Specific Conductance	3100		1.0	1.0	umhos/cm			11/12/11 10:12	1

Client Sample ID: OC-GW-79S
Date Collected: 11/09/11 10:20
Date Received: 11/10/11 18:20

Lab Sample ID: 360-37526-5
Matrix: Water

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	1200		40	40	mg/L			11/24/11 10:52	20
Chloride	140		10	10	mg/L			11/24/11 10:36	10
Ammonia	110		1.0	1.0	mg/L		11/22/11 11:45	11/23/11 14:55	10
Specific Conductance	2800		1.0	1.0	umhos/cm			11/12/11 10:13	1

General Chemistry

Client Sample ID: OC-PZ-16RR
Date Collected: 11/09/11 10:30
Date Received: 11/10/11 18:20

Lab Sample ID: 360-37526-6
Matrix: Water

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	1100		40	40	mg/L			11/24/11 11:25	20
Chloride	170		10	10	mg/L			11/24/11 11:08	10
Ammonia	250		5.0	5.0	mg/L		11/22/11 11:45	11/23/11 15:11	50
Specific Conductance	3000		1.0	1.0	umhos/cm			11/12/11 10:15	1

Client Sample ID: OC-PZ-17RR
Date Collected: 11/09/11 12:00
Date Received: 11/10/11 18:20

Lab Sample ID: 360-37526-7
Matrix: Water

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	400		20	20	mg/L			12/01/11 17:52	10
Chloride	24		1.0	1.0	mg/L			11/19/11 07:42	1
Ammonia	48		1.0	1.0	mg/L		11/22/11 11:45	11/23/11 14:57	10
Specific Conductance	1300		1.0	1.0	umhos/cm			11/12/11 10:16	1

Client Sample ID: OC-PZ-18R
Date Collected: 11/09/11 12:55
Date Received: 11/10/11 18:20

Lab Sample ID: 360-37526-8
Matrix: Water

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	200		20	20	mg/L			11/24/11 11:57	10
Chloride	150		10	10	mg/L			11/24/11 11:57	10
Ammonia	62		1.0	1.0	mg/L		11/23/11 09:19	11/23/11 15:00	10
Specific Conductance	1200		1.0	1.0	umhos/cm			11/19/11 08:23	1

Client: Olin Corporation
Project/Site: Olin Chemical Semiannual

TestAmerica Job ID: 360-37526-1

Qualifiers

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

General Chemistry

Qualifier	Qualifier Description
4	MS, MSD: The analyte present in the original sample is 4 times greater than the matrix spike concentration; therefore, control limits are not applicable.
F	MS or MSD exceeds the control limits

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
☼	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CNF	Contains no Free Liquid
DL, RA, RE, IN	Indicates a Dilution, Reanalysis, Re-extraction, or additional Initial metals/anion analysis of the sample
EDL	Estimated Detection Limit
EPA	United States Environmental Protection Agency
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
RL	Reporting Limit
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Metals

Analysis Batch: 83421

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37526-1	OC-GW-78S	Dissolved	Water	6010B	
360-37526-2	OC-GW-35S	Dissolved	Water	6010B	
360-37526-3	OC-GW-201S	Dissolved	Water	6010B	
360-37526-3 MS	OC-GW-201S	Dissolved	Water	6010B	
360-37526-3 MSD	OC-GW-201S	Dissolved	Water	6010B	
360-37526-4	OC-GW-201S-DUP	Dissolved	Water	6010B	
360-37526-5	OC-GW-79S	Dissolved	Water	6010B	
360-37526-6	OC-PZ-16RR	Dissolved	Water	6010B	
360-37526-7	OC-PZ-17RR	Dissolved	Water	6010B	
360-37526-8	OC-PZ-18R	Dissolved	Water	6010B	
LCS 360-83421/1	Lab Control Sample	Total/NA	Water	6010B	
LCSD 360-83421/5	Lab Control Sample Dup	Total/NA	Water	6010B	
MB 360-83421/2	Method Blank	Total/NA	Water	6010B	

General Chemistry

Analysis Batch: 83283

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37526-1	OC-GW-78S	Total/NA	Water	SM 2510B	
360-37526-2	OC-GW-35S	Total/NA	Water	SM 2510B	
360-37526-4	OC-GW-201S-DUP	Total/NA	Water	SM 2510B	
360-37526-5	OC-GW-79S	Total/NA	Water	SM 2510B	
360-37526-6	OC-PZ-16RR	Total/NA	Water	SM 2510B	
360-37526-7	OC-PZ-17RR	Total/NA	Water	SM 2510B	
LCS 360-83283/1	Lab Control Sample	Total/NA	Water	SM 2510B	
MB 360-83283/3	Method Blank	Total/NA	Water	SM 2510B	

Analysis Batch: 83626

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37526-3	OC-GW-201S	Total/NA	Water	SM 2510B	
360-37526-3 DU	OC-GW-201S	Total/NA	Water	SM 2510B	
360-37526-8	OC-PZ-18R	Total/NA	Water	SM 2510B	
LCS 360-83626/1	Lab Control Sample	Total/NA	Water	SM 2510B	
MB 360-83626/3	Method Blank	Total/NA	Water	SM 2510B	

Prep Batch: 83754

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37526-1	OC-GW-78S	Total/NA	Water	Distill/Ammonia	
360-37526-2	OC-GW-35S	Total/NA	Water	Distill/Ammonia	
360-37526-3	OC-GW-201S	Total/NA	Water	Distill/Ammonia	
360-37526-3 MS	OC-GW-201S	Total/NA	Water	Distill/Ammonia	
360-37526-3 MSD	OC-GW-201S	Total/NA	Water	Distill/Ammonia	
360-37526-4	OC-GW-201S-DUP	Total/NA	Water	Distill/Ammonia	
360-37526-5	OC-GW-79S	Total/NA	Water	Distill/Ammonia	
360-37526-6	OC-PZ-16RR	Total/NA	Water	Distill/Ammonia	
360-37526-7	OC-PZ-17RR	Total/NA	Water	Distill/Ammonia	
LCS 360-83754/2-A	Lab Control Sample	Total/NA	Water	Distill/Ammonia	
MB 360-83754/1-A	Method Blank	Total/NA	Water	Distill/Ammonia	

Analysis Batch: 83764

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37526-7	OC-PZ-17RR	Total/NA	Water	300.0	

General Chemistry (Continued)

Analysis Batch: 83764 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 360-83764/6	Lab Control Sample	Total/NA	Water	300.0	
MB 360-83764/5	Method Blank	Total/NA	Water	300.0	

Analysis Batch: 83765

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37526-3	OC-GW-201S	Total/NA	Water	300.0	
360-37526-3 MS	OC-GW-201S	Total/NA	Water	300.0	
360-37526-3 MSD	OC-GW-201S	Total/NA	Water	300.0	
LCS 360-83765/6	Lab Control Sample	Total/NA	Water	300.0	
MB 360-83765/5	Method Blank	Total/NA	Water	300.0	

Analysis Batch: 83766

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37526-1	OC-GW-78S	Total/NA	Water	300.0	
360-37526-2	OC-GW-35S	Total/NA	Water	300.0	
LCS 360-83766/6	Lab Control Sample	Total/NA	Water	300.0	
MB 360-83766/5	Method Blank	Total/NA	Water	300.0	

Prep Batch: 83810

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37526-8	OC-PZ-18R	Total/NA	Water	Distill/Ammonia	
360-37526-8 MS	OC-PZ-18R	Total/NA	Water	Distill/Ammonia	
360-37526-8 MSD	OC-PZ-18R	Total/NA	Water	Distill/Ammonia	
LCS 360-83810/2-A	Lab Control Sample	Total/NA	Water	Distill/Ammonia	
MB 360-83810/1-A	Method Blank	Total/NA	Water	Distill/Ammonia	

Analysis Batch: 83912

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37526-1	OC-GW-78S	Total/NA	Water	L107-06-1B	83754
360-37526-2	OC-GW-35S	Total/NA	Water	L107-06-1B	83754
360-37526-3	OC-GW-201S	Total/NA	Water	L107-06-1B	83754
360-37526-3 MS	OC-GW-201S	Total/NA	Water	L107-06-1B	83754
360-37526-3 MSD	OC-GW-201S	Total/NA	Water	L107-06-1B	83754
360-37526-4	OC-GW-201S-DUP	Total/NA	Water	L107-06-1B	83754
360-37526-5	OC-GW-79S	Total/NA	Water	L107-06-1B	83754
360-37526-6	OC-PZ-16RR	Total/NA	Water	L107-06-1B	83754
360-37526-7	OC-PZ-17RR	Total/NA	Water	L107-06-1B	83754
LCS 360-83754/2-A	Lab Control Sample	Total/NA	Water	L107-06-1B	83754
MB 360-83754/1-A	Method Blank	Total/NA	Water	L107-06-1B	83754

Analysis Batch: 83913

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37526-8	OC-PZ-18R	Total/NA	Water	L107-06-1B	83810
360-37526-8 MS	OC-PZ-18R	Total/NA	Water	L107-06-1B	83810
360-37526-8 MSD	OC-PZ-18R	Total/NA	Water	L107-06-1B	83810
LCS 360-83810/2-A	Lab Control Sample	Total/NA	Water	L107-06-1B	83810
MB 360-83810/1-A	Method Blank	Total/NA	Water	L107-06-1B	83810

Analysis Batch: 83987

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37526-5	OC-GW-79S	Total/NA	Water	300.0	
360-37526-5	OC-GW-79S	Total/NA	Water	300.0	

General Chemistry (Continued)

Analysis Batch: 83987 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37526-6	OC-PZ-16RR	Total/NA	Water	300.0	
360-37526-6	OC-PZ-16RR	Total/NA	Water	300.0	
360-37526-8	OC-PZ-18R	Total/NA	Water	300.0	
LCS 360-83987/6	Lab Control Sample	Total/NA	Water	300.0	
MB 360-83987/5	Method Blank	Total/NA	Water	300.0	

Analysis Batch: 84080

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37526-1	OC-GW-78S	Total/NA	Water	300.0	
360-37526-2	OC-GW-35S	Total/NA	Water	300.0	
360-37526-3	OC-GW-201S	Total/NA	Water	300.0	
360-37526-3 MS	OC-GW-201S	Total/NA	Water	300.0	
360-37526-3 MSD	OC-GW-201S	Total/NA	Water	300.0	
360-37526-4	OC-GW-201S-DUP	Total/NA	Water	300.0	
360-37526-4	OC-GW-201S-DUP	Total/NA	Water	300.0	
LCS 360-84080/4	Lab Control Sample	Total/NA	Water	300.0	
MB 360-84080/3	Method Blank	Total/NA	Water	300.0	

Analysis Batch: 84209

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37526-7	OC-PZ-17RR	Total/NA	Water	300.0	
LCS 360-84209/6	Lab Control Sample	Total/NA	Water	300.0	
MB 360-84209/5	Method Blank	Total/NA	Water	300.0	

Method: 6010B - Dissolved Metals

Lab Sample ID: MB 360-83421/2
Matrix: Water
Analysis Batch: 83421

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		100	13	ug/L			11/15/11 16:59	1
Chromium	ND		5.0	0.65	ug/L			11/15/11 16:59	1

Lab Sample ID: LCS 360-83421/1
Matrix: Water
Analysis Batch: 83421

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	5000	5190		ug/L		104	80 - 120
Chromium	1000	999		ug/L		100	80 - 120

Lab Sample ID: LCSD 360-83421/5
Matrix: Water
Analysis Batch: 83421

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	5000	5240		ug/L		105	80 - 120	1	20
Chromium	1000	1030		ug/L		103	80 - 120	3	20

Lab Sample ID: 360-37526-3 MS
Matrix: Water
Analysis Batch: 83421

Client Sample ID: OC-GW-201S
Prep Type: Dissolved

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	ND		5000	4980		ug/L		100	75 - 125
Chromium	16		1000	970		ug/L		95	75 - 125

Lab Sample ID: 360-37526-3 MSD
Matrix: Water
Analysis Batch: 83421

Client Sample ID: OC-GW-201S
Prep Type: Dissolved

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	ND		5000	5070		ug/L		101	75 - 125	2	20
Chromium	16		1000	997		ug/L		98	75 - 125	3	20

Method: 300.0 - Chloride & Sulfate

Lab Sample ID: MB 360-83764/5
Matrix: Water
Analysis Batch: 83764

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	ND		2.0	2.0	mg/L			11/19/11 03:57	1
Chloride	ND		1.0	1.0	mg/L			11/19/11 03:57	1

Lab Sample ID: LCS 360-83764/6
Matrix: Water
Analysis Batch: 83764

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	80.0	83.2		mg/L		104	85 - 115

Method: 300.0 - Chloride & Sulfate (Continued)

Lab Sample ID: LCS 360-83764/6
Matrix: Water
Analysis Batch: 83764

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	40.0	42.1		mg/L		105	85 - 115

Lab Sample ID: MB 360-83765/5
Matrix: Water
Analysis Batch: 83765

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	ND		2.0	2.0	mg/L			11/19/11 10:56	1
Chloride	ND		1.0	1.0	mg/L			11/19/11 10:56	1

Lab Sample ID: LCS 360-83765/6
Matrix: Water
Analysis Batch: 83765

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	80.0	83.1		mg/L		104	85 - 115
Chloride	40.0	42.0		mg/L		105	85 - 115

Lab Sample ID: 360-37526-3 MS
Matrix: Water
Analysis Batch: 83765

Client Sample ID: OC-GW-201S
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	77		100	190		mg/L		113	75 - 125

Lab Sample ID: 360-37526-3 MSD
Matrix: Water
Analysis Batch: 83765

Client Sample ID: OC-GW-201S
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	77		100	190		mg/L		113	75 - 125	0	20

Lab Sample ID: MB 360-83766/5
Matrix: Water
Analysis Batch: 83766

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		1.0	1.0	mg/L			11/19/11 17:55	1

Lab Sample ID: LCS 360-83766/6
Matrix: Water
Analysis Batch: 83766

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	40.0	41.9		mg/L		105	85 - 115

Method: 300.0 - Chloride & Sulfate (Continued)

Lab Sample ID: MB 360-83987/5
Matrix: Water
Analysis Batch: 83987

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	ND		2.0	2.0	mg/L			11/24/11 09:00	1
Chloride	ND		1.0	1.0	mg/L			11/24/11 09:00	1

Lab Sample ID: LCS 360-83987/6
Matrix: Water
Analysis Batch: 83987

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	80.0	86.5		mg/L		108	85 - 115
Chloride	40.0	43.9		mg/L		110	85 - 115

Lab Sample ID: MB 360-84080/3
Matrix: Water
Analysis Batch: 84080

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	ND		2.0	2.0	mg/L			11/28/11 20:17	1
Chloride	ND		1.0	1.0	mg/L			11/28/11 20:17	1

Lab Sample ID: LCS 360-84080/4
Matrix: Water
Analysis Batch: 84080

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	80.0	77.4		mg/L		97	85 - 115
Chloride	40.0	39.8		mg/L		99	85 - 115

Lab Sample ID: 360-37526-3 MS
Matrix: Water
Analysis Batch: 84080

Client Sample ID: OC-GW-201S
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	1400		400	1770		mg/L		92	75 - 125

Lab Sample ID: 360-37526-3 MSD
Matrix: Water
Analysis Batch: 84080

Client Sample ID: OC-GW-201S
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Sulfate	1400		400	1590	F	mg/L		47	75 - 125	11	20

Lab Sample ID: MB 360-84209/5
Matrix: Water
Analysis Batch: 84209

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	ND		2.0	2.0	mg/L			12/01/11 16:00	1
Chloride	ND		1.0	1.0	mg/L			12/01/11 16:00	1

Method: 300.0 - Chloride & Sulfate (Continued)

Lab Sample ID: LCS 360-84209/6
Matrix: Water
Analysis Batch: 84209

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	80.0	78.5		mg/L		98	85 - 115
Chloride	40.0	41.4		mg/L		103	85 - 115

Method: L107-06-1B - Nitrogen Ammonia

Lab Sample ID: MB 360-83754/1-A
Matrix: Water
Analysis Batch: 83912

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 83754

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	ND		0.10	0.10	mg/L		11/22/11 11:45	11/23/11 14:05	1

Lab Sample ID: LCS 360-83754/2-A
Matrix: Water
Analysis Batch: 83912

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 83754

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Ammonia	10.0	9.28		mg/L		93	90 - 110

Lab Sample ID: 360-37526-3 MS
Matrix: Water
Analysis Batch: 83912

Client Sample ID: OC-GW-201S
Prep Type: Total/NA
Prep Batch: 83754

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Ammonia	180		10.0	192	4	mg/L		134	90 - 110

Lab Sample ID: 360-37526-3 MSD
Matrix: Water
Analysis Batch: 83912

Client Sample ID: OC-GW-201S
Prep Type: Total/NA
Prep Batch: 83754

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Ammonia	180		10.0	188	4	mg/L		97	90 - 110	2	20

Lab Sample ID: MB 360-83810/1-A
Matrix: Water
Analysis Batch: 83913

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 83810

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	ND		0.10	0.10	mg/L		11/23/11 09:19	11/23/11 14:25	1

Lab Sample ID: LCS 360-83810/2-A
Matrix: Water
Analysis Batch: 83913

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 83810

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Ammonia	10.0	10.4		mg/L		104	90 - 110

Method: L107-06-1B - Nitrogen Ammonia (Continued)

Lab Sample ID: 360-37526-8 MS
Matrix: Water
Analysis Batch: 83913

Client Sample ID: OC-PZ-18R
Prep Type: Total/NA
Prep Batch: 83810

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Ammonia	62		10.0	71.2	4	mg/L		93	90 - 110

Lab Sample ID: 360-37526-8 MSD
Matrix: Water
Analysis Batch: 83913

Client Sample ID: OC-PZ-18R
Prep Type: Total/NA
Prep Batch: 83810

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Ammonia	62		10.0	74.0	4	mg/L		121	90 - 110	4	20

Method: SM 2510B - Conductivity, Specific Conductance

Lab Sample ID: MB 360-83283/3
Matrix: Water
Analysis Batch: 83283

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	ND		1.0	1.0	umhos/cm			11/12/11 09:43	1

Lab Sample ID: LCS 360-83283/1
Matrix: Water
Analysis Batch: 83283

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Specific Conductance	1410	1410		umhos/cm		100	85 - 115

Lab Sample ID: MB 360-83626/3
Matrix: Water
Analysis Batch: 83626

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	ND		1.0	1.0	umhos/cm			11/19/11 08:19	1

Lab Sample ID: LCS 360-83626/1
Matrix: Water
Analysis Batch: 83626

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Specific Conductance	1410	1400		umhos/cm		99	85 - 115

Lab Sample ID: 360-37526-3 DU
Matrix: Water
Analysis Batch: 83626

Client Sample ID: OC-GW-201S
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Specific Conductance	3100		3120		umhos/cm		0.3	20

TestAmerica Westfield

Analytical Dilution Preparation Log

Date: 11-18-11

Analyst Initials	Date	Method	LIMs Sample ID	Rpt'd Dil.	Sample Aliquot 1	Units	Final Volume 1	Units	Serial Dilution				Comments
									Sample Aliquot 2	Units	Final Volume 2	Units	
RW	11-18-11	300.0	37684 C1	10X	1	mL	10	mL					
			C1	50X	200	µL							
			C2	10X	1	mL							
			C2	50X	200	µL							
			375263	10X	1	mL	10	mL					
			37552C9	10X	1	mL	10	mL					

entries completed by day [new page each day]

TestAmerica Westfield

Analytical Dilution Preparation Log

Date: 11-28-11

Analyst Initials	Date	Method	LIMs Sample ID	Rpt'd Dil.	Sample Aliquot 1	Units	Final Volume 1	Units	Serial Dilution: Sample Aliquot 2	Serial Dilution: Units	Serial Dilution: Final Volume 2	Serial Dilution: Units	Comments
RME	11-28-11	300.0	37526 E3	20X	500	µL	10	mL					
↓	↓	↓	37552 C2	10X	1	mL	↓	↓					
			C3	10X	1	mL							
			C1	10X	1	mL							
			C6	10X	1	mL							
			C8	10X	1	mL							
			37526 B4	10X	1	mL							
			↓	20X	500	µL							
			B1	10X	1	mL							
			B2	10X	1	mL							
↓	↓	↓	37552 C7	20X	500	µL	↓	↓					

entries completed by day [new page each day]

0519

TestAmerica Westfield

Analytical Dilution Preparation Log

Date: 11-23-11

Analyst Initials	Date	Method	LIMs Sample ID	Rpt'd Dil.	Sample Aliquot 1	Units	Final Volume 1	Units	Serial Dilution				Comments
									Sample Aliquot 2	Units	Final Volume 2	Units	
RWE	11-23-11	NH3	37526A3A	10X	1	mL	10	mL					
			MS	10X	1								
			MSD	10X	1								
			37525A2A	10X	1	mL	10	mL					
			37526A1A	10X	1								
			A2A	10X	1								
			A4A	10X	1								
			A5A	10X	1								
			A6A	10X	1								
			A7A	10X	1								
			A8A	10X	1								
			MS	10X	1								
			MSD	10X	1								
			37527B1	10X	1								
			37552B6A	10X	1								
			B7A	10X	1								
			B8A	10X	1								
			B9A	10X	1								
			37596A1A	10X	1								

entries completed by day [new page each day]

TestAmerica Westfield

Analytical Dilution Preparation Log

Date: 11-23-11

Analyst Initials	Date	Method	LIMs Sample ID	Rpt'd Dil.	Sample Aliquot 1	Units	Final Volume 1	Units	Serial Dilution				Comments
									Sample Aliquot 2	Units	Final Volume 2	Units	
RJF	11-23-11	NH3	37526A6A	50X	200	uL	10	mL					
"	"	"	37552B7A	50X	"	"	"	"					

entries completed by day [new page each day]

12/2/2011

015e

Lab Chronicle

Client: Olin Corporation
Project/Site: Olin Chemical Semiannual

TestAmerica Job ID: 360-37526-1

Client Sample ID: OC-GW-78S

Lab Sample ID: 360-37526-1

Date Collected: 11/09/11 11:40

Matrix: Water

Date Received: 11/10/11 18:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Analysis	6010B		1	83421	11/15/11 17:47	TJS	TAL WFD
Total/NA	Analysis	SM 2510B		1	83283	11/12/11 10:09	AMS	TAL WFD
Total/NA	Analysis	300.0		1	83766	11/19/11 20:20	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			83754	11/22/11 11:45	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		10	83912	11/23/11 14:52	RWE	TAL WFD
Total/NA	Analysis	300.0		10	84080	11/29/11 00:03	RWE	TAL WFD

Client Sample ID: OC-GW-35S

Lab Sample ID: 360-37526-2

Date Collected: 11/09/11 14:05

Matrix: Water

Date Received: 11/10/11 18:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Analysis	6010B		1	83421	11/15/11 17:50	TJS	TAL WFD
Total/NA	Analysis	SM 2510B		1	83283	11/12/11 10:10	AMS	TAL WFD
Total/NA	Analysis	300.0		1	83766	11/19/11 20:36	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			83754	11/22/11 11:45	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		10	83912	11/23/11 14:53	RWE	TAL WFD
Total/NA	Analysis	300.0		10	84080	11/29/11 00:19	RWE	TAL WFD

Client Sample ID: OC-GW-201S

Lab Sample ID: 360-37526-3

Date Collected: 11/09/11 09:20

Matrix: Water

Date Received: 11/10/11 18:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Analysis	6010B		1	83421	11/15/11 17:29	TJS	TAL WFD
Total/NA	Analysis	SM 2510B		1	83626	11/19/11 08:20	AMS	TAL WFD
Total/NA	Analysis	300.0		10	83765	11/19/11 11:44	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			83754	11/22/11 11:45	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		10	83912	11/23/11 14:48	RWE	TAL WFD
Total/NA	Analysis	300.0		20	84080	11/28/11 20:49	RWE	TAL WFD

Client Sample ID: OC-GW-201S-DUP

Lab Sample ID: 360-37526-4

Date Collected: 11/09/11 09:20

Matrix: Water

Date Received: 11/10/11 18:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Analysis	6010B		1	83421	11/15/11 17:53	TJS	TAL WFD
Total/NA	Analysis	SM 2510B		1	83283	11/12/11 10:12	AMS	TAL WFD
Total/NA	Prep	Distill/Ammonia			83754	11/22/11 11:45	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		10	83912	11/23/11 14:54	RWE	TAL WFD
Total/NA	Analysis	300.0		10	84080	11/28/11 22:58	RWE	TAL WFD
Total/NA	Analysis	300.0		20	84080	11/28/11 23:14	RWE	TAL WFD

Client Sample ID: OC-GW-79S

Lab Sample ID: 360-37526-5

Date Collected: 11/09/11 10:20

Matrix: Water

Date Received: 11/10/11 18:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Analysis	6010B		1	83421	11/15/11 17:56	TJS	TAL WFD
Total/NA	Analysis	SM 2510B		1	83283	11/12/11 10:13	AMS	TAL WFD
Total/NA	Prep	Distill/Ammonia			83754	11/22/11 11:45	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		10	83912	11/23/11 14:55	RWE	TAL WFD
Total/NA	Analysis	300.0		10	83987	11/24/11 10:36	RWE	TAL WFD
Total/NA	Analysis	300.0		20	83987	11/24/11 10:52	RWE	TAL WFD

Client Sample ID: OC-PZ-16RR

Lab Sample ID: 360-37526-6

Date Collected: 11/09/11 10:30

Matrix: Water

Date Received: 11/10/11 18:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Analysis	6010B		1	83421	11/15/11 17:59	TJS	TAL WFD
Total/NA	Analysis	SM 2510B		1	83283	11/12/11 10:15	AMS	TAL WFD
Total/NA	Prep	Distill/Ammonia			83754	11/22/11 11:45	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		50	83912	11/23/11 15:11	RWE	TAL WFD
Total/NA	Analysis	300.0		10	83987	11/24/11 11:08	RWE	TAL WFD
Total/NA	Analysis	300.0		20	83987	11/24/11 11:25	RWE	TAL WFD

Client Sample ID: OC-PZ-17RR

Lab Sample ID: 360-37526-7

Date Collected: 11/09/11 12:00

Matrix: Water

Date Received: 11/10/11 18:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Analysis	6010B		1	83421	11/15/11 18:02	TJS	TAL WFD
Total/NA	Analysis	SM 2510B		1	83283	11/12/11 10:16	AMS	TAL WFD
Total/NA	Analysis	300.0		1	83764	11/19/11 07:42	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			83754	11/22/11 11:45	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		10	83912	11/23/11 14:57	RWE	TAL WFD
Total/NA	Analysis	300.0		10	84209	12/01/11 17:52	AMS	TAL WFD

Client Sample ID: OC-PZ-18R

Lab Sample ID: 360-37526-8

Date Collected: 11/09/11 12:55

Matrix: Water

Date Received: 11/10/11 18:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Analysis	6010B		1	83421	11/15/11 18:05	TJS	TAL WFD
Total/NA	Analysis	SM 2510B		1	83626	11/19/11 08:23	AMS	TAL WFD
Total/NA	Prep	Distill/Ammonia			83810	11/23/11 09:19	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		10	83913	11/23/11 15:00	RWE	TAL WFD
Total/NA	Analysis	300.0		10	83987	11/24/11 11:57	RWE	TAL WFD

Lab Chronicle

Client: Olin Corporation
Project/Site: Olin Chemical Semiannual

TestAmerica Job ID: 360-37526-1

Laboratory References:

TAL WFD = TestAmerica Westfield, Westfield Executive Park, 53 Southampton Road, Westfield, MA 01085, TEL (413)572-4000

Certification Summary

Client: Olin Corporation
Project/Site: Olin Chemical Semiannual

TestAmerica Job ID: 360-37526-1

Laboratory	Authority	Program	EPA Region	Certification ID
TestAmerica Westfield	Connecticut	State Program	1	PH-0494
TestAmerica Westfield	Maine	State Program	1	MA00014
TestAmerica Westfield	Massachusetts	State Program	1	M-MA014
TestAmerica Westfield	New Hampshire	NELAC	1	2539
TestAmerica Westfield	New York	NELAC	2	10843
TestAmerica Westfield	North Carolina	North Carolina DENR	4	647
TestAmerica Westfield	Rhode Island	State Program	1	LAO00057

Accreditation may not be offered or required for all methods and analytes reported in this package. Please contact your project manager for the laboratory's current list of certified methods and analytes.

State Accreditation Matrix

Method Name	Description	State where **Primary** Accreditation is Carried		
		New Hampshire (NELAC)	Mass	Conn
821-R-02-012	Toxicity, Acute (48-Hour)(list upon request)	NP		
SM 4500 Cl F	Chlorine, Residual		NP	
SM 9215E	Heterotrophic Plate Count (SimPlate)		P	
SM 9222D	Coliforms, Fecal (Membrane Filter)		P/NP	
SM 9223	Coliforms, Total, and E.Coli (Colilert-P/A)		P	
SM 9224	Coliforms, Total, and E.Coli (Enumeration)		P	
1103.1	E.coli		ambient/ source	
Enterolert	Enterococcus			
200.8 Rev 5.4	Metals (ICP/MS) (list upon request)	NP/P	NP/P	
200.7 Rev 4.4	Metals (ICP)(list upon request)	NP/P	NP/P	
6010B/C	Metals (ICP)(list upon request)	NP/SW		
245.1	Mercury (CVAA)	NP/P	NP	
7470A	Mercury (CVAA)	NP		
7471A	Mercury (CVAA)	SW		
SM 2340B	Total Hardness (as CaCO3) by calculation	NP/P	NP	
3005A	Preparation, Total Recoverable or Dissolved Metals	NP/P		
3010A	Preparation, Total Metals	NP/P		
3020A	Preparation, Total Metals	NP/P/SW		
3050B	Preparation, Metals	SW		
504.1	EDB, DBCP and 1,2,3-TCP (GC)	P	P	
608	Organochlorine Pest/PCBs (list upon request)	NP	NP	
625	Semivolatile Org Comp (GC/MS)(list upon request)	NP	NP	
3546	Microwave Extraction	SW		
3510C	Liquid-Liquid Extraction (Separatory Funnel)	NP		
3550B	Ultrasonic Extraction	SW		
8081AB	Organochlorine Pesticides (GC)(list upon request)	NP/SW		
8082/A	PCBs by Gas Chromatography(list upon request)	NP/SW		
8270C/D	Semivolatile Comp.(GC/MS)(list upon request)	NP/SW		
CT ETPH	Conn - Ext. Total petroleum Hydrocarbons (GC)	NP/SW		NP/SW
MA-EPH	Mass - Extractable Petroleum Hydrocarbons (GC)	NP/SW		
524.2	Volatile Org Comp (GC/MS)(list upon request)	P	P	
524.2	Trihalomethane compounds	P	P	
624	Volatile Org Comp (GC/MS)(list upon request)	NP	NP	
5035	Closed System Purge and Trap	SW		
5030B	Purge and Trap	NP		
8260B/C	Volatile Org Comp. (GC/MS)(list upon request)	NP/SW		
MAVPH	Mass - Volatile Petroleum Hydrocarbons (GC)			
180.1	Turbidity, Nephelometric	P	P	
300	Anions, Ion Chromatography	NP/P	NP/P	
410.4	COD	NP	NP	
1010	Ignitability, Pensky-Martens Closed-Cup Method	SW		
10-107-06-2	Nitrogen, Total Kjeldahl	NP	NP	
7196A	Chromium, Hexavalent	NP/SW		
9012A	Cyanide, Total and/or Amenable	NP/SW		
9030B	Sulfide, Distillation (Acid Soluble and Insoluble)	NP		
9045C	pH	SW		
L107041C	Nitrogen, Nitrate	NP	P	
L107-06-1B	Nitrogen Ammonia	NP	NP	
L204001A CN	Cyanide, Total	P	NP/P	
L210-001A	Phenolics, Total Recoverable	NP	NP	
SM 2320B	Alkalinity	NP/P	NP/P	
SM 2510B	Conductivity, Specific Conductance	NP/P	NP/P	
SM 2540C	Solids, Total Dissolved (TDS)	NP/P	NP/P	
SM 2540D	Solids, Total Suspended (TSS)	NP	NP	
SM 3500 CR D	Chromium, Hexavalent	NP		
SM 4500 H+ B	pH	NP/P	NP/P	
SM 4500 NO2 B	Nitrogen, Nitrite	NP	P	
SM 4500 P E	Phosphorus, Orthophosphate	NP/P	NP	
SM 4500 P E	Phosphorus, Total	NP	NP	
SM 4500 S2 D	Sulfide, Total	NP		
SM 5210B	BOD, 5-Day	NP	NP	
SM 5310B	Organic Carbon, Total (TOC)	NP/P	NP	

Not all organic compounds are accreditied under NELAC
For methods with multiple compounds all compounds may not meet NELAC criteria, listing should be obtained from the laboratory
The lab carries additional accreditations with several states. This is the laboratories typcial listing but is subject to change based on the laboratories current certification standing.

Login Sample Receipt Checklist

Client: Olin Corporation

Job Number: 360-37526-1

Login Number: 37526

List Source: TestAmerica Westfield

List Number: 1

Creator: Ard, Vanessa L

Question	Answer	Comment
Radioactivity either was not measured or, if measured, is at or below background	N/A	
The cooler's custody seal, if present, is intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica Westfield
Westfield Executive Park 53 Southampton Road
Westfield, MA 01085
Phone (413) 572-4000 Fax (413) 572-3707

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Chris Mundin?	Lab PM: Becky Mason	Carrier Tracking No(s):	COC No: 017505
Client Contact: James Cashwell	Phone:	E-Mail:		Page:
Company: Olin Corporation				Job #:
Address: 51 Eames St	Due Date Requested:	Analysis Requested		Preservation Codes: A - HCL, B - NaOH, C - Zn Acetate, D - Nitric Acid, E - NaHSO4, F - MeOH, H - Ascorbic Acid, I - Ice, J - DI Water, M - Hexane, N - None, P - Na2O4S, Q - Na2SO3, R - Na2S2SO3, S - H2SO4, Z - other (specify)
City: Wilmington	TAT Requested (days): Standard			
State, Zip: MA 01887	Quote #:			Regulatory programs: MCP ☐ GW1/S1 ☐ RCP ☐ CT RSR ☐ DEP Form ☐ EDD Required ☐
Phone:	PO #:			
Email:	WO #:			
Project Name/number: Olin Semiannual Sampling	SSOW#:			
Site: Olin Wilmington, MA				

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Sampler's Initials	Field Filtered Sample?	Perform MS/MSD?	Ammonia	Chloride/Sulfate/Spec Cond	Dis Al/Cr * Field Filtered	Total Number of containers	Special Instructions/Note:
			Preservation Code:					S	N	D	3	
OC-GW-78S	11/9/11	1140	G	GW	CTM	Y	N	X	X	X	3	
OC-GW-35S	11/9/11	1405	G	GW	CTM	Y	N	X	X	X	3	
OC-GW-20IS	11/9/11	0920	G	GW	CTM	Y	Y	X	X	X	3	
OC-GW-20IS-DUP	11/9/11	0920	G	GW	CTM	Y	Y	X	X	X	3	
OC-GW-20IS-MS	11/9/11	0920	G	GW	CTM	Y	Y	X	X	X	3	
OC-GW-20IS-MSD	11/9/11	0920	G	GW	CTM	Y	Y	X	X	X	3	
OC-GW-79S	11/9/11	1020	G	GW	CTM	Y	N	X	X	X	3	
~~OC-PZ-16RR~~ OC-PZ-16RR	11/9/11	1030	G	GW	CTM	Y	N	X	X	X	3	
OC-PZ-17RR	11/9/11	1200	G	GW	CTM	Y	N	X	X	X	3	
OC-PZ-18R	11/9/11	1255	G	GW	CTM	Y	N	X	X	X	3	

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	11/9/11 1500	AMEC		11/9/11 3:00	
Relinquished by:	Date/Time: 11/9/11 1530	Company	Received by:	Date/Time: 11/9/11 1537	Company
Relinquished by:	Date/Time: 11-10-11 1545	Company	Received by:	Date/Time: 11-10-11 1545	Company
Custody Seals Intact: Δ Yes Δ No	Custody Seal No.: 11-10-11 1920		Cooler Temperature(s) °C and Other Remarks:		

TAL-8245-360 0310

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12/2/2011

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TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Westfield
Westfield Executive Park
53 Southampton Road
Westfield, MA 01085
Tel: (413)572-4000

CHECKED FOR COMPLETENESS OF PARAMETERS ORDERED BY:

TestAmerica Job ID: 360-37552-1
Client Project/Site: Olin Chemical Groundwater

For:
Olin Corporation
PO BOX 248
Charleston, Tennessee 37310-0248

Attn: Mr. James Cashwell

Authorized for release by:
12/2/2011 2:12:56 PM
Chris Reynolds
QA Manager
chris.reynolds@testamericainc.com

Designee for

Becky Mason
Project Manager II
becky.mason@testamericainc.com

Table of Contents

Client: Olin Corporation
Project/Site: Olin Chemical Groundwater

TestAmerica Job ID: 360-37552-1

Job ID: 360-37552-1

Laboratory: TestAmerica Westfield

Narrative

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

RECEIPT

The samples were received on 11/10/2011; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 7.1 C.

Note: All samples that require thermal preservation are considered acceptable if the arrival temperature is within the method's specified temperature range or for general analysis, ranging from 6°C to just above the freezing temperature of water. Samples that are hand delivered, immediately following collection, may not meet these criteria; however, they will be considered acceptable according to NELAC and State standards, if there is evidence that the chilling process has begun, such as stored and transported to the laboratory on ice.

DISSOLVED METALS

Samples OC-GW-CA1 (360-37552-1), OC-GW-42S (360-37552-2), OC-GW-43SR (360-37552-3), OC-GW-34SR (360-37552-4), OC-GW-34D (360-37552-5), OC-GW-202S (360-37552-6), OC-GW-202D (360-37552-7), OC-PZ-24 (360-37552-8) and OC-PZ-25 (360-37552-9) were analyzed for dissolved metals in accordance with EPA SW-846 Method 6010B. The samples were analyzed on 11/15/2011 and 11/16/2011.

At the request of the client, an abbreviated/modified MCP analyte list was reported for this job.

No difficulties were encountered during the dissolved metals analyses.

All quality control parameters were within the acceptance limits.

SPECIFIC CONDUCTIVITY

Samples OC-GW-CA1 (360-37552-1), OC-GW-42S (360-37552-2), OC-GW-43SR (360-37552-3), OC-GW-34SR (360-37552-4), OC-GW-34D (360-37552-5), OC-GW-202S (360-37552-6), OC-GW-202D (360-37552-7), OC-PZ-24 (360-37552-8) and OC-PZ-25 (360-37552-9) were analyzed for specific conductivity in accordance with SM20 2510B. The samples were analyzed on 11/19/2011.

No difficulties were encountered during the conductivity analyses.

All quality control parameters were within the acceptance limits.

ANIONS (28 DAY HOLD TIME)

Samples OC-GW-CA1 (360-37552-1), OC-GW-42S (360-37552-2), OC-GW-43SR (360-37552-3), OC-GW-34SR (360-37552-4), OC-GW-34D (360-37552-5), OC-GW-202S (360-37552-6), OC-GW-202D (360-37552-7), OC-PZ-24 (360-37552-8) and OC-PZ-25 (360-37552-9) were analyzed for anions (28 day hold time) in accordance with EPA Method 300.0. The samples were analyzed on 11/19/2011, 11/28/2011 and 11/30/2011.

Sulfate failed the recovery criteria low for the MSD of sample 360-37526-3 in batch 360-84080.

Refer to the QC report for details.

Samples OC-GW-CA1 (360-37552-1)[10X], OC-GW-42S (360-37552-2)[10X], OC-GW-43SR (360-37552-3)[10X], OC-GW-202S (360-37552-6)[10X], OC-GW-202D (360-37552-7)[50X], OC-PZ-24 (360-37552-8)[10X] and OC-PZ-25 (360-37552-9)[10X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

Job ID: 360-37552-1 (Continued)

Laboratory: TestAmerica Westfield (Continued)

No other difficulties were encountered during the anions analyses.

All other quality control parameters were within the acceptance limits.

AMMONIA

Samples OC-GW-CA1 (360-37552-1), OC-GW-42S (360-37552-2), OC-GW-43SR (360-37552-3), OC-GW-34SR (360-37552-4), OC-GW-34D (360-37552-5), OC-GW-202S (360-37552-6), OC-GW-202D (360-37552-7), OC-PZ-24 (360-37552-8) and OC-PZ-25 (360-37552-9) were analyzed for ammonia in accordance with Lachat 107-06-1B. The samples were prepared and analyzed on 11/23/2011.

Ammonia failed the recovery criteria high for the MSD of sample 360-37526-8 in batch 360-83913. The presence of the '4' qualifier in the report indicates analytes where the concentration in the unspiked sample exceeded four times the spiking amount.

Refer to the QC report for details.

Samples OC-GW-202S (360-37552-6)[10X], OC-GW-202D (360-37552-7)[50X], OC-PZ-24 (360-37552-8)[10X] and OC-PZ-25 (360-37552-9)[10X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No other difficulties were encountered during the ammonia analyses.

All other quality control parameters were within the acceptance limits.

MassDEP Analytical Protocol Certification Form

Laboratory Name: **TestAmerica Westfield** Project #: **360-37552-1**

Project Location: **Wilmington MA** RTN:

This form provides certifications for the following data set: list Laboratory Sample ID Number(s):

360-37552-1[1-9]

Matrices: [X] Groundwater/Surface Water [ ] Soil/Sediment [ ] Drinking Water [ ] Air [ ] Other:

CAM Protocols (check all that apply below):

8260 VOC CAM II A [ ]	7470/7471 Hg CAM III B [ ]	Mass DEP VPH CAM IV A [ ]	8081 Pesticides CAM V B [ ]	7196 Hex Cr CAM VI B [ ]	Mass DEP APH CAM IX A [ ]
8270 SVOC CAM II B [ ]	7010 Metals CAM III C [ ]	Mass DEP EPH CAM IV B [ ]	8151 Herbicides CAM V C [ ]	8330 Explosives CAM VIII A [ ]	TO-15 VOC CAM IX B [ ]
6010 Metals CAM III A [X]	6020 Metals CAM III D [ ]	8082 PCB CAM V A [ ]	9014 Total Cyanide/PAC CAM VI A [ ]	332.0 Perchlorate CAM VIII B [ ]	

Affirmative Responses to Questions A through F are required for "Presumptive Certainty" status

A	Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding time.	[X] Yes [ ] No
B	Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed?	[X] Yes [ ] No
C	Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances?	[X] Yes [ ] No
D	Does the laboratory report comply with all the reporting requirements specified in CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	[X] Yes [ ] No
E	a. VPH, EPH and APH Methods only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications). b. APH and TO-15 Methods only: Was the complete analyte list reported for each method?	[ ] Yes [ ] No [ ] Yes [ ] No
F	Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to Questions A through E)?	[X] Yes [ ] No

Responses to Questions G, H and I below are required for "Presumptive Certainty" status

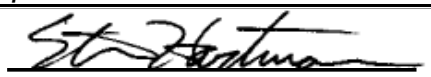
G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)?	[X] Yes [ ] No[1]

***Data User Note:* Data that achieve "Presumptive Certainty" status may not necessarily meet the data usability and representativeness requirements described in 310 CMR 40. 1056 (2)(k) and WCS-07-350**

H	Were **all** QC performance standards specified in the CAM protocol(s) achieved?	[X] Yes [ ] No
I	Were results reported for the complete analyte list specified in the selected CAM protocol(s) ?	[ ] Yes [X] No

[1] All negative responses must be addressed in an attached laboratory narrative.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, is accurate and complete.

Signature:  Position: Laboratory Director

Printed Name: Steven C. Hartmann Date: 12/2/11 13:52

This form has been electronically signed and approved

Detection Summary

Client: Olin Corporation
Project/Site: Olin Chemical Groundwater

TestAmerica Job ID: 360-37552-1

Client Sample ID: OC-GW-CA1 — Lab Sample ID: 360-37552-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	17	J	100	13	ug/L	1		6010B	Dissolved
Chromium	6.6		5.0	0.65	ug/L	1		6010B	Dissolved

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	93		20	20	mg/L	10		300.0	Total/NA
Chloride	9.6		1.0	1.0	mg/L	1		300.0	Total/NA
Ammonia	0.77		0.10	0.10	mg/L	1		L107-06-1B	Total/NA
Specific Conductance	690		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

Client Sample ID: OC-GW-42S — Lab Sample ID: 360-37552-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	450		100	13	ug/L	1		6010B	Dissolved
Chromium	7.9		5.0	0.65	ug/L	1		6010B	Dissolved

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	12		2.0	2.0	mg/L	1		300.0	Total/NA
Chloride	120		10	10	mg/L	10		300.0	Total/NA
Ammonia	1.0		0.10	0.10	mg/L	1		L107-06-1B	Total/NA
Specific Conductance	500		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

Client Sample ID: OC-GW-43SR — Lab Sample ID: 360-37552-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	53	J	100	13	ug/L	1		6010B	Dissolved
Chromium	1.2	J	5.0	0.65	ug/L	1		6010B	Dissolved

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	32		2.0	2.0	mg/L	1		300.0	Total/NA
Chloride	180		10	10	mg/L	10		300.0	Total/NA
Ammonia	2.5		0.10	0.10	mg/L	1		L107-06-1B	Total/NA
Specific Conductance	730		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

Client Sample ID: OC-GW-34SR — Lab Sample ID: 360-37552-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chromium	1.4	J	5.0	0.65	ug/L	1		6010B	Dissolved

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	7.9		2.0	2.0	mg/L	1		300.0	Total/NA
Chloride	2.3		1.0	1.0	mg/L	1		300.0	Total/NA
Ammonia	0.21		0.10	0.10	mg/L	1		L107-06-1B	Total/NA
Specific Conductance	79		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

Client Sample ID: OC-GW-34D — Lab Sample ID: 360-37552-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chromium	15		10	1.3	ug/L	2		6010B	Dissolved

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	60		2.0	2.0	mg/L	1		300.0	Total/NA
Chloride	4.9		1.0	1.0	mg/L	1		300.0	Total/NA
Ammonia	20		0.10	0.10	mg/L	1		L107-06-1B	Total/NA
Specific Conductance	250		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

Client Sample ID: OC-GW-202S — Lab Sample ID: 360-37552-6

Client Sample ID: OC-GW-202S (Continued) — Lab Sample ID: 360-37552-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chromium	4.8	J	5.0	0.65	ug/L	1		6010B	Dissolved

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	330		20	20	mg/L	10		300.0	Total/NA
Chloride	45		1.0	1.0	mg/L	1		300.0	Total/NA
Ammonia	60		1.0	1.0	mg/L	10		L107-06-1B	Total/NA
Specific Conductance	1100		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

Client Sample ID: OC-GW-202D — Lab Sample ID: 360-37552-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	13000		200	25	ug/L	2		6010B	Dissolved
Chromium	1000		10	1.3	ug/L	2		6010B	Dissolved

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	1700		100	100	mg/L	50		300.0	Total/NA
Chloride	260		50	50	mg/L	50		300.0	Total/NA
Ammonia	300		5.0	5.0	mg/L	50		L107-06-1B	Total/NA
Specific Conductance	4400		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

Client Sample ID: OC-PZ-24 — Lab Sample ID: 360-37552-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chromium	18		5.0	0.65	ug/L	1		6010B	Dissolved

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	690		20	20	mg/L	10		300.0	Total/NA
Chloride	23		1.0	1.0	mg/L	1		300.0	Total/NA
Ammonia	73		1.0	1.0	mg/L	10		L107-06-1B	Total/NA
Specific Conductance	2000		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

Client Sample ID: OC-PZ-25 — Lab Sample ID: 360-37552-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chromium	9.9		5.0	0.65	ug/L	1		6010B	Dissolved

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	490		20	20	mg/L	10		300.0	Total/NA
Chloride	21		1.0	1.0	mg/L	1		300.0	Total/NA
Ammonia	51		1.0	1.0	mg/L	10		L107-06-1B	Total/NA
Specific Conductance	1400		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

Method Summary

Client: Olin Corporation
Project/Site: Olin Chemical Groundwater

TestAmerica Job ID: 360-37552-1

Method	Method Description	Protocol	Laboratory
6010B	Dissolved Metals	SW846	TAL WFD
300.0	Chloride & Sulfate	40CFR136A	TAL WFD
L107-06-1B	Nitrogen Ammonia	LACHAT	TAL WFD
SM 2510B	Conductivity, Specific Conductance	SM	TAL WFD

Protocol References:

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.
LACHAT = LACHAT

SM = "Standard Methods For The Examination Of Water And Wastewater",

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL WFD = TestAmerica Westfield, Westfield Executive Park, 53 Southampton Road, Westfield, MA 01085, TEL (413)572-4000

Sample Summary

Client: Olin Corporation
Project/Site: Olin Chemical Groundwater

TestAmerica Job ID: 360-37552-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
360-37552-1	OC-GW-CA1	Water	11/10/11 10:50	11/10/11 18:20
360-37552-2	OC-GW-42S	Water	11/10/11 09:50	11/10/11 18:20
360-37552-3	OC-GW-43SR	Water	11/10/11 08:45	11/10/11 18:20
360-37552-4	OC-GW-34SR	Water	11/10/11 11:35	11/10/11 18:20
360-37552-5	OC-GW-34D	Water	11/10/11 12:20	11/10/11 18:20
360-37552-6	OC-GW-202S	Water	11/10/11 10:10	11/10/11 18:20
360-37552-7	OC-GW-202D	Water	11/10/11 09:35	11/10/11 18:20
360-37552-8	OC-PZ-24	Water	11/10/11 11:10	11/10/11 18:20
360-37552-9	OC-PZ-25	Water	11/10/11 11:40	11/10/11 18:20

Method: 6010B - Dissolved Metals - Dissolved

Client Sample ID: OC-GW-CA1
Date Collected: 11/10/11 10:50
Date Received: 11/10/11 18:20

Lab Sample ID: 360-37552-1
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**17**	**J**	100	13	ug/L			11/15/11 18:25	1
Chromium	**6.6**		5.0	0.65	ug/L			11/15/11 18:25	1

Client Sample ID: OC-GW-42S
Date Collected: 11/10/11 09:50
Date Received: 11/10/11 18:20

Lab Sample ID: 360-37552-2
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**450**		100	13	ug/L			11/15/11 18:37	1
Chromium	**7.9**		5.0	0.65	ug/L			11/15/11 18:37	1

Client Sample ID: OC-GW-43SR
Date Collected: 11/10/11 08:45
Date Received: 11/10/11 18:20

Lab Sample ID: 360-37552-3
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**53**	**J**	100	13	ug/L			11/15/11 18:40	1
Chromium	**1.2**	**J**	5.0	0.65	ug/L			11/15/11 18:40	1

Client Sample ID: OC-GW-34SR
Date Collected: 11/10/11 11:35
Date Received: 11/10/11 18:20

Lab Sample ID: 360-37552-4
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		100	13	ug/L			11/15/11 18:43	1
Chromium	**1.4**	**J**	5.0	0.65	ug/L			11/15/11 18:43	1

Client Sample ID: OC-GW-34D
Date Collected: 11/10/11 12:20
Date Received: 11/10/11 18:20

Lab Sample ID: 360-37552-5
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		200	25	ug/L			11/16/11 19:20	2
Chromium	**15**		10	1.3	ug/L			11/16/11 19:20	2

Client Sample ID: OC-GW-202S
Date Collected: 11/10/11 10:10
Date Received: 11/10/11 18:20

Lab Sample ID: 360-37552-6
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		100	13	ug/L			11/15/11 18:54	1
Chromium	**4.8**	**J**	5.0	0.65	ug/L			11/15/11 18:54	1

Client Sample ID: OC-GW-202D
Date Collected: 11/10/11 09:35
Date Received: 11/10/11 18:20

Lab Sample ID: 360-37552-7
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**13000**		200	25	ug/L			11/16/11 19:23	2

Method: 6010B - Dissolved Metals - Dissolved (Continued)

Client Sample ID: OC-GW-202D
Date Collected: 11/10/11 09:35
Date Received: 11/10/11 18:20

Lab Sample ID: 360-37552-7
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	**1000**		10	1.3	ug/L			11/16/11 19:23	2

Client Sample ID: OC-PZ-24
Date Collected: 11/10/11 11:10
Date Received: 11/10/11 18:20

Lab Sample ID: 360-37552-8
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		100	13	ug/L			11/15/11 19:00	1
Chromium	**18**		5.0	0.65	ug/L			11/15/11 19:00	1

Client Sample ID: OC-PZ-25
Date Collected: 11/10/11 11:40
Date Received: 11/10/11 18:20

Lab Sample ID: 360-37552-9
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		100	13	ug/L			11/15/11 19:03	1
Chromium	**9.9**		5.0	0.65	ug/L			11/15/11 19:03	1

General Chemistry

Client Sample ID: OC-GW-CA1
Date Collected: 11/10/11 10:50
Date Received: 11/10/11 18:20

Lab Sample ID: 360-37552-1
Matrix: Water

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	93		20	20	mg/L			11/28/11 22:10	10
Chloride	9.6		1.0	1.0	mg/L			11/19/11 08:14	1
Ammonia	0.77		0.10	0.10	mg/L		11/23/11 09:19	11/23/11 14:33	1
Specific Conductance	690		1.0	1.0	umhos/cm			11/19/11 08:25	1

Client Sample ID: OC-GW-42S
Date Collected: 11/10/11 09:50
Date Received: 11/10/11 18:20

Lab Sample ID: 360-37552-2
Matrix: Water

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	12		2.0	2.0	mg/L			11/19/11 08:31	1
Chloride	120		10	10	mg/L			11/28/11 21:38	10
Ammonia	1.0		0.10	0.10	mg/L		11/23/11 09:19	11/23/11 14:34	1
Specific Conductance	500		1.0	1.0	umhos/cm			11/19/11 08:26	1

Client Sample ID: OC-GW-43SR
Date Collected: 11/10/11 08:45
Date Received: 11/10/11 18:20

Lab Sample ID: 360-37552-3
Matrix: Water

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	32		2.0	2.0	mg/L			11/19/11 08:47	1
Chloride	180		10	10	mg/L			11/28/11 21:54	10
Ammonia	2.5		0.10	0.10	mg/L		11/23/11 09:19	11/23/11 14:37	1
Specific Conductance	730		1.0	1.0	umhos/cm			11/19/11 08:27	1

Client Sample ID: OC-GW-34SR
Date Collected: 11/10/11 11:35
Date Received: 11/10/11 18:20

Lab Sample ID: 360-37552-4
Matrix: Water

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	7.9		2.0	2.0	mg/L			11/19/11 09:03	1
Chloride	2.3		1.0	1.0	mg/L			11/19/11 09:03	1
Ammonia	0.21		0.10	0.10	mg/L		11/23/11 09:19	11/23/11 14:38	1
Specific Conductance	79		1.0	1.0	umhos/cm			11/19/11 08:29	1

Client Sample ID: OC-GW-34D
Date Collected: 11/10/11 12:20
Date Received: 11/10/11 18:20

Lab Sample ID: 360-37552-5
Matrix: Water

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	60		2.0	2.0	mg/L			11/19/11 09:19	1
Chloride	4.9		1.0	1.0	mg/L			11/19/11 09:19	1
Ammonia	20		0.10	0.10	mg/L		11/23/11 09:19	11/23/11 14:39	1
Specific Conductance	250		1.0	1.0	umhos/cm			11/19/11 08:30	1

General Chemistry

Client Sample ID: OC-GW-202S
Date Collected: 11/10/11 10:10
Date Received: 11/10/11 18:20

Lab Sample ID: 360-37552-6
Matrix: Water

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	330		20	20	mg/L			11/28/11 22:26	10
Chloride	45		1.0	1.0	mg/L			11/19/11 09:35	1
Ammonia	60		1.0	1.0	mg/L		11/23/11 09:19	11/23/11 15:04	10
Specific Conductance	1100		1.0	1.0	umhos/cm			11/19/11 08:32	1

Client Sample ID: OC-GW-202D
Date Collected: 11/10/11 09:35
Date Received: 11/10/11 18:20

Lab Sample ID: 360-37552-7
Matrix: Water

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	1700		100	100	mg/L			11/30/11 09:23	50
Chloride	260		50	50	mg/L			11/30/11 09:23	50
Ammonia	300		5.0	5.0	mg/L		11/23/11 09:19	11/23/11 15:12	50
Specific Conductance	4400		1.0	1.0	umhos/cm			11/19/11 08:33	1

Client Sample ID: OC-PZ-24
Date Collected: 11/10/11 11:10
Date Received: 11/10/11 18:20

Lab Sample ID: 360-37552-8
Matrix: Water

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	690		20	20	mg/L			11/28/11 22:42	10
Chloride	23		1.0	1.0	mg/L			11/19/11 10:07	1
Ammonia	73		1.0	1.0	mg/L		11/23/11 09:19	11/23/11 15:06	10
Specific Conductance	2000		1.0	1.0	umhos/cm			11/19/11 08:39	1

Client Sample ID: OC-PZ-25
Date Collected: 11/10/11 11:40
Date Received: 11/10/11 18:20

Lab Sample ID: 360-37552-9
Matrix: Water

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	490		20	20	mg/L			11/19/11 12:48	10
Chloride	21		1.0	1.0	mg/L			11/19/11 12:32	1
Ammonia	51		1.0	1.0	mg/L		11/23/11 09:19	11/23/11 15:07	10
Specific Conductance	1400		1.0	1.0	umhos/cm			11/19/11 08:42	1

Client: Olin Corporation
Project/Site: Olin Chemical Groundwater

TestAmerica Job ID: 360-37552-1

Qualifiers

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
☼	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CNF	Contains no Free Liquid
DL, RA, RE, IN	Indicates a Dilution, Reanalysis, Re-extraction, or additional Initial metals/anion analysis of the sample
EDL	Estimated Detection Limit
EPA	United States Environmental Protection Agency
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
RL	Reporting Limit
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Metals

Analysis Batch: 83422

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37552-1	OC-GW-CA1	Dissolved	Water	6010B	
360-37552-1 DU	OC-GW-CA1	Dissolved	Water	6010B	
360-37552-1 MS	OC-GW-CA1	Dissolved	Water	6010B	
360-37552-2	OC-GW-42S	Dissolved	Water	6010B	
360-37552-3	OC-GW-43SR	Dissolved	Water	6010B	
360-37552-4	OC-GW-34SR	Dissolved	Water	6010B	
360-37552-6	OC-GW-202S	Dissolved	Water	6010B	
360-37552-8	OC-PZ-24	Dissolved	Water	6010B	
360-37552-9	OC-PZ-25	Dissolved	Water	6010B	
LCS 360-83422/1	Lab Control Sample	Total/NA	Water	6010B	
LCSD 360-83422/10	Lab Control Sample Dup	Total/NA	Water	6010B	
MB 360-83422/2	Method Blank	Total/NA	Water	6010B	

Analysis Batch: 83502

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37552-5	OC-GW-34D	Dissolved	Water	6010B	
360-37552-7	OC-GW-202D	Dissolved	Water	6010B	
LCS 360-83502/1	Lab Control Sample	Total/NA	Water	6010B	
LCSD 360-83502/9	Lab Control Sample Dup	Total/NA	Water	6010B	
MB 360-83502/2	Method Blank	Total/NA	Water	6010B	

General Chemistry

Analysis Batch: 83626

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37552-1	OC-GW-CA1	Total/NA	Water	SM 2510B	
360-37552-2	OC-GW-42S	Total/NA	Water	SM 2510B	
360-37552-3	OC-GW-43SR	Total/NA	Water	SM 2510B	
360-37552-4	OC-GW-34SR	Total/NA	Water	SM 2510B	
360-37552-5	OC-GW-34D	Total/NA	Water	SM 2510B	
360-37552-6	OC-GW-202S	Total/NA	Water	SM 2510B	
360-37552-7	OC-GW-202D	Total/NA	Water	SM 2510B	
360-37552-8	OC-PZ-24	Total/NA	Water	SM 2510B	
360-37552-8 DU	OC-PZ-24	Total/NA	Water	SM 2510B	
360-37552-9	OC-PZ-25	Total/NA	Water	SM 2510B	
LCS 360-83626/1	Lab Control Sample	Total/NA	Water	SM 2510B	
MB 360-83626/3	Method Blank	Total/NA	Water	SM 2510B	

Analysis Batch: 83764

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37552-1	OC-GW-CA1	Total/NA	Water	300.0	
360-37552-2	OC-GW-42S	Total/NA	Water	300.0	
360-37552-3	OC-GW-43SR	Total/NA	Water	300.0	
360-37552-4	OC-GW-34SR	Total/NA	Water	300.0	
360-37552-5	OC-GW-34D	Total/NA	Water	300.0	
360-37552-6	OC-GW-202S	Total/NA	Water	300.0	
360-37552-8	OC-PZ-24	Total/NA	Water	300.0	
LCS 360-83764/6	Lab Control Sample	Total/NA	Water	300.0	
MB 360-83764/5	Method Blank	Total/NA	Water	300.0	

General Chemistry (Continued)

Analysis Batch: 83765

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37552-9	OC-PZ-25	Total/NA	Water	300.0	
360-37552-9	OC-PZ-25	Total/NA	Water	300.0	
LCS 360-83765/6	Lab Control Sample	Total/NA	Water	300.0	
MB 360-83765/5	Method Blank	Total/NA	Water	300.0	

Prep Batch: 83810

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37552-1	OC-GW-CA1	Total/NA	Water	Distill/Ammonia	
360-37552-2	OC-GW-42S	Total/NA	Water	Distill/Ammonia	
360-37552-3	OC-GW-43SR	Total/NA	Water	Distill/Ammonia	
360-37552-4	OC-GW-34SR	Total/NA	Water	Distill/Ammonia	
360-37552-5	OC-GW-34D	Total/NA	Water	Distill/Ammonia	
360-37552-6	OC-GW-202S	Total/NA	Water	Distill/Ammonia	
360-37552-7	OC-GW-202D	Total/NA	Water	Distill/Ammonia	
360-37552-8	OC-PZ-24	Total/NA	Water	Distill/Ammonia	
360-37552-9	OC-PZ-25	Total/NA	Water	Distill/Ammonia	
LCS 360-83810/2-A	Lab Control Sample	Total/NA	Water	Distill/Ammonia	
MB 360-83810/1-A	Method Blank	Total/NA	Water	Distill/Ammonia	

Analysis Batch: 83913

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37552-1	OC-GW-CA1	Total/NA	Water	L107-06-1B	83810
360-37552-2	OC-GW-42S	Total/NA	Water	L107-06-1B	83810
360-37552-3	OC-GW-43SR	Total/NA	Water	L107-06-1B	83810
360-37552-4	OC-GW-34SR	Total/NA	Water	L107-06-1B	83810
360-37552-5	OC-GW-34D	Total/NA	Water	L107-06-1B	83810
360-37552-6	OC-GW-202S	Total/NA	Water	L107-06-1B	83810
360-37552-7	OC-GW-202D	Total/NA	Water	L107-06-1B	83810
360-37552-8	OC-PZ-24	Total/NA	Water	L107-06-1B	83810
360-37552-9	OC-PZ-25	Total/NA	Water	L107-06-1B	83810
LCS 360-83810/2-A	Lab Control Sample	Total/NA	Water	L107-06-1B	83810
MB 360-83810/1-A	Method Blank	Total/NA	Water	L107-06-1B	83810

Analysis Batch: 84080

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37552-1	OC-GW-CA1	Total/NA	Water	300.0	
360-37552-2	OC-GW-42S	Total/NA	Water	300.0	
360-37552-3	OC-GW-43SR	Total/NA	Water	300.0	
360-37552-6	OC-GW-202S	Total/NA	Water	300.0	
360-37552-8	OC-PZ-24	Total/NA	Water	300.0	
LCS 360-84080/4	Lab Control Sample	Total/NA	Water	300.0	
MB 360-84080/3	Method Blank	Total/NA	Water	300.0	

Analysis Batch: 84154

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37552-7	OC-GW-202D	Total/NA	Water	300.0	
360-37552-7 MS	OC-GW-202D	Total/NA	Water	300.0	
360-37552-7 MSD	OC-GW-202D	Total/NA	Water	300.0	
LCS 360-84154/4	Lab Control Sample	Total/NA	Water	300.0	
MB 360-84154/3	Method Blank	Total/NA	Water	300.0	

Method: 6010B - Dissolved Metals

Lab Sample ID: MB 360-83422/2
Matrix: Water
Analysis Batch: 83422

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		100	13	ug/L			11/15/11 18:13	1
Chromium	ND		5.0	0.65	ug/L			11/15/11 18:13	1

Lab Sample ID: LCS 360-83422/1
Matrix: Water
Analysis Batch: 83422

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	5000	5050		ug/L		101	80 - 120
Chromium	1000	1030		ug/L		103	80 - 120

Lab Sample ID: LCSD 360-83422/10
Matrix: Water
Analysis Batch: 83422

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	5000	5280		ug/L		106	80 - 120	4	20
Chromium	1000	1070		ug/L		107	80 - 120	4	20

Lab Sample ID: MB 360-83502/2
Matrix: Water
Analysis Batch: 83502

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		100	13	ug/L			11/16/11 18:36	1
Chromium	ND		5.0	0.65	ug/L			11/16/11 18:36	1

Lab Sample ID: LCS 360-83502/1
Matrix: Water
Analysis Batch: 83502

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	5000	4980		ug/L		100	80 - 120
Chromium	1000	996		ug/L		100	80 - 120

Lab Sample ID: LCSD 360-83502/9
Matrix: Water
Analysis Batch: 83502

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	5000	4640		ug/L		93	80 - 120	7	20
Chromium	1000	941		ug/L		94	80 - 120	6	20

Lab Sample ID: 360-37552-1 MS
Matrix: Water
Analysis Batch: 83422

Client Sample ID: OC-GW-CA1
Prep Type: Dissolved

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	17	J	5000	5190		ug/L		103	75 - 125
Chromium	6.6		1000	1040		ug/L		104	75 - 125

Method: 6010B - Dissolved Metals (Continued)

Lab Sample ID: 360-37552-1 DU
Matrix: Water
Analysis Batch: 83422

Client Sample ID: OC-GW-CA1
Prep Type: Dissolved

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Aluminum	17	J	18.4	J	ug/L		10	20
Chromium	6.6		6.76		ug/L		3	20

Method: 300.0 - Chloride & Sulfate

Lab Sample ID: MB 360-83764/5
Matrix: Water
Analysis Batch: 83764

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	ND		2.0	2.0	mg/L			11/19/11 03:57	1
Chloride	ND		1.0	1.0	mg/L			11/19/11 03:57	1

Lab Sample ID: LCS 360-83764/6
Matrix: Water
Analysis Batch: 83764

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	80.0	83.2		mg/L		104	85 - 115
Chloride	40.0	42.1		mg/L		105	85 - 115

Lab Sample ID: MB 360-83765/5
Matrix: Water
Analysis Batch: 83765

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	ND		2.0	2.0	mg/L			11/19/11 10:56	1
Chloride	ND		1.0	1.0	mg/L			11/19/11 10:56	1

Lab Sample ID: LCS 360-83765/6
Matrix: Water
Analysis Batch: 83765

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	80.0	83.1		mg/L		104	85 - 115
Chloride	40.0	42.0		mg/L		105	85 - 115

Lab Sample ID: MB 360-84080/3
Matrix: Water
Analysis Batch: 84080

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	ND		2.0	2.0	mg/L			11/28/11 20:17	1
Chloride	ND		1.0	1.0	mg/L			11/28/11 20:17	1

Lab Sample ID: LCS 360-84080/4
Matrix: Water
Analysis Batch: 84080

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	80.0	77.4		mg/L		97	85 - 115

Method: 300.0 - Chloride & Sulfate (Continued)

Lab Sample ID: LCS 360-84080/4
Matrix: Water
Analysis Batch: 84080

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	40.0	39.8		mg/L		99	85 - 115

Lab Sample ID: MB 360-84154/3
Matrix: Water
Analysis Batch: 84154

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	ND		2.0	2.0	mg/L			11/30/11 08:19	1
Chloride	ND		1.0	1.0	mg/L			11/30/11 08:19	1

Lab Sample ID: LCS 360-84154/4
Matrix: Water
Analysis Batch: 84154

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	80.0	78.0		mg/L		97	85 - 115
Chloride	40.0	41.2		mg/L		103	85 - 115

Lab Sample ID: 360-37552-7 MS
Matrix: Water
Analysis Batch: 84154

Client Sample ID: OC-GW-202D
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	1700		1000	2840		mg/L		109	75 - 125
Chloride	260		500	817		mg/L		110	75 - 125

Lab Sample ID: 360-37552-7 MSD
Matrix: Water
Analysis Batch: 84154

Client Sample ID: OC-GW-202D
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Sulfate	1700		1000	2670		mg/L		93	75 - 125	6	20
Chloride	260		500	778		mg/L		103	75 - 125	5	20

Method: L107-06-1B - Nitrogen Ammonia

Lab Sample ID: MB 360-83810/1-A
Matrix: Water
Analysis Batch: 83913

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 83810

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	ND		0.10	0.10	mg/L		11/23/11 09:19	11/23/11 14:25	1

Lab Sample ID: LCS 360-83810/2-A
Matrix: Water
Analysis Batch: 83913

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 83810

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Ammonia	10.0	10.4		mg/L		104	90 - 110

Method: SM 2510B - Conductivity, Specific Conductance

Lab Sample ID: MB 360-83626/3
Matrix: Water
Analysis Batch: 83626

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	ND		1.0	1.0	umhos/cm			11/19/11 08:19	1

Lab Sample ID: LCS 360-83626/1
Matrix: Water
Analysis Batch: 83626

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Specific Conductance			1410	1400		umhos/cm		99	85 - 115		

Lab Sample ID: 360-37552-8 DU
Matrix: Water
Analysis Batch: 83626

Client Sample ID: OC-PZ-24
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier		DU Result	DU Qualifier	Unit	D			RPD	RPD Limit
Specific Conductance	2000			1960		umhos/cm				0.2	20

TestAmerica Westfield

Analytical Dilution Preparation Log

Date: 11-16-11

Analyst Initials	Date	Method	LIMs Sample ID	Rpt'd Dil.	Sample Aliquot 1	Units	Final Volume 1	Units	Serial Dilution				Comments
									Sample Aliquot 2	Units	Final Volume 2	Units	
JB	11-16-11	6010	37552-5	2x	5	mL	10	mL					
↓	↓	↓	37552-7	2x	5	mL	10	mL					

11.17

entries completed by day [new page each day]

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TestAmerica Westfield

Analytical Dilution Preparation Log

Date: 11-18-11

Analyst Initials	Date	Method	LIMs Sample ID	Rpt'd Dil.	Sample Aliquot 1	Units	Final Volume 1	Units	Serial Dilution				Comments
									Sample Aliquot 2	Units	Final Volume 2	Units	
RW	11-18-11	300.0	376840 C1	10X	1	mL	10	mL					
			C1	50X	200	µL							
			C2	10X	1	mL							
			C2	50X	200	µL							
			376B63	10X	1	mL	10	mL					
			3755209	10X	1	mL	10	mL					

entries completed by day [new page each day]

TestAmerica Westfield

Analytical Dilution Preparation Log

Date: 11-23-11

Analyst Initials	Date	Method	LIMs Sample ID	Rpt'd Dil.	Sample Aliquot 1	Units	Final Volume 1	Units	Serial Dilution				Comments
									Sample Aliquot 2	Units	Final Volume 2	Units	
RWE	11-23-11	NH3	37526A3A	10X	1	mL	10	mL					
			MS	10X	1								
			MSD	10X	1								
			37525A2A	10X	1	mL	10	mL					
			37526A1A	10X	1								
			A2A	10X	1								
			A4A	10X	1								
			A5A	10X	1								
			A6A	10X	1								
			A7A	10X	1								
			A8A	10X	1								
			MS	10X	1								
			MSD	10X	1								
			37527B1	10X	1								
			37552B6A	10X	1								
			B7A	10X	1								
			B8A	10X	1								
			B9A	10X	1								
			37596A1A	10X	1								

entries completed by day [new page each day]

TestAmerica Westfield

Analytical Dilution Preparation Log

Date: 11-23-11

Analyst Initials	Date	Method	LIMs Sample ID	Rpt'd Dil.	Sample Aliquot 1	Units	Final Volume 1	Units	Serial Dilution				Comments
									Sample Aliquot 2	Units	Final Volume 2	Units	
RJF	11-23-11	NH3	37526A6A	50X	200	uL	10	mL					
"	"	"	37552B7A	50X	"	"	"	"					

entries completed by day [new page each day]

12/2/2011

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TestAmerica Westfield

Analytical Dilution Preparation Log

Date: 11-28-11

Analyst Initials	Date	Method	LIMs Sample ID	Rpt'd Dil.	Sample Aliquot 1	Units	Final Volume 1	Units	Serial Dilution: Sample Aliquot 2	Units	Final Volume 2	Units	Comments
PW	11-28-11	300.0	37526 E3	20X	500	µL	10	mL					
↓	↓	↓	37552 C2	10X	1	mL	↓	↓					
			C3	10X	1	mL							
			C1	10X	1	mL							
			C6	10X	1	mL							
			C8	10X	1	mL							
			37526 B4	10X	1	mL							
			↓	20X	500	µL							
			B1	10X	1	mL							
			B2	10X	1	mL	↓	✓					
✓	✓	✓	37552 C7	20X	500	µL							

entries completed by day [new page each day]

0519

[redacted]

TestAmerica Westfield

Date: 11/30/11

Analytical Dilution Preparation Log

Analyst Initials	Date	Method	LIMs Sample ID	Rpt'd Dil.	Sample Aliquot 1	Units	Final Volume 1	Units	Serial Dilution: Sample Aliquot 2	Serial Dilution: Units	Serial Dilution: Final Volume 2	Serial Dilution: Units	Comments
[redacted]	11/30	300.0	37552C7	50	200	µL	10	mL					
			37644B3	10	1	mL	10	mL					
			MS										
↓	↓	↓	MSD	↓	↓	↓	↓	↓					

entries completed by day [new page each day]

0529

12/7/2011

Lab Chronicle

Client: Olin Corporation
Project/Site: Olin Chemical Groundwater

TestAmerica Job ID: 360-37552-1

Client Sample ID: OC-GW-CA1

Lab Sample ID: 360-37552-1

Date Collected: 11/10/11 10:50

Matrix: Water

Date Received: 11/10/11 18:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Analysis	6010B		1	83422	11/15/11 18:25	TJS	TAL WFD
Total/NA	Analysis	SM 2510B		1	83626	11/19/11 08:25	AMS	TAL WFD
Total/NA	Analysis	300.0		1	83764	11/19/11 08:14	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			83810	11/23/11 09:19	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		1	83913	11/23/11 14:33	RWE	TAL WFD
Total/NA	Analysis	300.0		10	84080	11/28/11 22:10	RWE	TAL WFD

Client Sample ID: OC-GW-42S

Lab Sample ID: 360-37552-2

Date Collected: 11/10/11 09:50

Matrix: Water

Date Received: 11/10/11 18:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Analysis	6010B		1	83422	11/15/11 18:37	TJS	TAL WFD
Total/NA	Analysis	SM 2510B		1	83626	11/19/11 08:26	AMS	TAL WFD
Total/NA	Analysis	300.0		1	83764	11/19/11 08:31	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			83810	11/23/11 09:19	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		1	83913	11/23/11 14:34	RWE	TAL WFD
Total/NA	Analysis	300.0		10	84080	11/28/11 21:38	RWE	TAL WFD

Client Sample ID: OC-GW-43SR

Lab Sample ID: 360-37552-3

Date Collected: 11/10/11 08:45

Matrix: Water

Date Received: 11/10/11 18:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Analysis	6010B		1	83422	11/15/11 18:40	TJS	TAL WFD
Total/NA	Analysis	SM 2510B		1	83626	11/19/11 08:27	AMS	TAL WFD
Total/NA	Analysis	300.0		1	83764	11/19/11 08:47	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			83810	11/23/11 09:19	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		1	83913	11/23/11 14:37	RWE	TAL WFD
Total/NA	Analysis	300.0		10	84080	11/28/11 21:54	RWE	TAL WFD

Client Sample ID: OC-GW-34SR

Lab Sample ID: 360-37552-4

Date Collected: 11/10/11 11:35

Matrix: Water

Date Received: 11/10/11 18:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Analysis	6010B		1	83422	11/15/11 18:43	TJS	TAL WFD
Total/NA	Analysis	SM 2510B		1	83626	11/19/11 08:29	AMS	TAL WFD
Total/NA	Analysis	300.0		1	83764	11/19/11 09:03	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			83810	11/23/11 09:19	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		1	83913	11/23/11 14:38	RWE	TAL WFD

Lab Chronicle

Client: Olin Corporation
Project/Site: Olin Chemical Groundwater

TestAmerica Job ID: 360-37552-1

Client Sample ID: OC-GW-34D

Lab Sample ID: 360-37552-5

Date Collected: 11/10/11 12:20
Matrix: Water
Date Received: 11/10/11 18:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Analysis	6010B		2	83502	11/16/11 19:20	TJS	TAL WFD
Total/NA	Analysis	SM 2510B		1	83626	11/19/11 08:30	AMS	TAL WFD
Total/NA	Analysis	300.0		1	83764	11/19/11 09:19	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			83810	11/23/11 09:19	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		1	83913	11/23/11 14:39	RWE	TAL WFD

Client Sample ID: OC-GW-202S

Lab Sample ID: 360-37552-6

Date Collected: 11/10/11 10:10
Matrix: Water
Date Received: 11/10/11 18:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Analysis	6010B		1	83422	11/15/11 18:54	TJS	TAL WFD
Total/NA	Analysis	SM 2510B		1	83626	11/19/11 08:32	AMS	TAL WFD
Total/NA	Analysis	300.0		1	83764	11/19/11 09:35	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			83810	11/23/11 09:19	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		10	83913	11/23/11 15:04	RWE	TAL WFD
Total/NA	Analysis	300.0		10	84080	11/28/11 22:26	RWE	TAL WFD

Client Sample ID: OC-GW-202D

Lab Sample ID: 360-37552-7

Date Collected: 11/10/11 09:35
Matrix: Water
Date Received: 11/10/11 18:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Analysis	6010B		2	83502	11/16/11 19:23	TJS	TAL WFD
Total/NA	Analysis	SM 2510B		1	83626	11/19/11 08:33	AMS	TAL WFD
Total/NA	Prep	Distill/Ammonia			83810	11/23/11 09:19	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		50	83913	11/23/11 15:12	RWE	TAL WFD
Total/NA	Analysis	300.0		50	84154	11/30/11 09:23	AMS	TAL WFD

Client Sample ID: OC-PZ-24

Lab Sample ID: 360-37552-8

Date Collected: 11/10/11 11:10
Matrix: Water
Date Received: 11/10/11 18:20

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Analysis	6010B		1	83422	11/15/11 19:00	TJS	TAL WFD
Total/NA	Analysis	SM 2510B		1	83626	11/19/11 08:39	AMS	TAL WFD
Total/NA	Analysis	300.0		1	83764	11/19/11 10:07	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			83810	11/23/11 09:19	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		10	83913	11/23/11 15:06	RWE	TAL WFD
Total/NA	Analysis	300.0		10	84080	11/28/11 22:42	RWE	TAL WFD

Lab Chronicle

Client: Olin Corporation
Project/Site: Olin Chemical Groundwater

TestAmerica Job ID: 360-37552-1

Client Sample ID: OC-PZ-25
Date Collected: 11/10/11 11:40
Date Received: 11/10/11 18:20

Lab Sample ID: 360-37552-9
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Analysis	6010B		1	83422	11/15/11 19:03	TJS	TAL WFD
Total/NA	Analysis	SM 2510B		1	83626	11/19/11 08:42	AMS	TAL WFD
Total/NA	Analysis	300.0		1	83765	11/19/11 12:32	RWE	TAL WFD
Total/NA	Analysis	300.0		10	83765	11/19/11 12:48	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			83810	11/23/11 09:19	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		10	83913	11/23/11 15:07	RWE	TAL WFD

Laboratory References:

TAL WFD = TestAmerica Westfield, Westfield Executive Park, 53 Southampton Road, Westfield, MA 01085, TEL (413)572-4000

Certification Summary

Client: Olin Corporation
Project/Site: Olin Chemical Groundwater

TestAmerica Job ID: 360-37552-1

Laboratory	Authority	Program	EPA Region	Certification ID
TestAmerica Westfield	Connecticut	State Program	1	PH-0494
TestAmerica Westfield	Maine	State Program	1	MA00014
TestAmerica Westfield	Massachusetts	State Program	1	M-MA014
TestAmerica Westfield	New Hampshire	NELAC	1	2539
TestAmerica Westfield	New York	NELAC	2	10843
TestAmerica Westfield	North Carolina	North Carolina DENR	4	647
TestAmerica Westfield	Rhode Island	State Program	1	LAO00057

Accreditation may not be offered or required for all methods and analytes reported in this package. Please contact your project manager for the laboratory's current list of certified methods and analytes.

State Accreditation Matrix

Method Name	Description	State where **Primary** Accreditation is Carried		
		New Hampshire (NELAC)	Mass	Conn
821-R-02-012	Toxicity, Acute (48-Hour)(list upon request)	NP		
SM 4500 Cl F	Chlorine, Residual		NP	
SM 9215E	Heterotrophic Plate Count (SimPlate)		P	
SM 9222D	Coliforms, Fecal (Membrane Filter)		P/NP	
SM 9223	Coliforms, Total, and E.Coli (Colilert-P/A)		P	
SM 9224	Coliforms, Total, and E.Coli (Enumeration)		P	
1103.1	E.coli		ambient/ source	
Enterolert	Enterococcus			
200.8 Rev 5.4	Metals (ICP/MS) (list upon request)	NP/P	NP/P	
200.7 Rev 4.4	Metals (ICP)(list upon request)	NP/P	NP/P	
6010B/C	Metals (ICP)(list upon request)	NP/SW		
245.1	Mercury (CVAA)	NP/P	NP	
7470A	Mercury (CVAA)	NP		
7471A	Mercury (CVAA)	SW		
SM 2340B	Total Hardness (as CaCO3) by calculation	NP/P	NP	
3005A	Preparation, Total Recoverable or Dissolved Metals	NP/P		
3010A	Preparation, Total Metals	NP/P		
3020A	Preparation, Total Metals	NP/P/SW		
3050B	Preparation, Metals	SW		
504.1	EDB, DBCP and 1,2,3-TCP (GC)	P	P	
608	Organochlorine Pest/PCBs (list upon request)	NP	NP	
625	Semivolatile Org Comp (GC/MS)(list upon request)	NP	NP	
3546	Microwave Extraction	SW		
3510C	Liquid-Liquid Extraction (Separatory Funnel)	NP		
3550B	Ultrasonic Extraction	SW		
8081AB	Organochlorine Pesticides (GC)(list upon request)	NP/SW		
8082/A	PCBs by Gas Chromatography(list upon request)	NP/SW		
8270C/D	Semivolatile Comp.(GC/MS)(list upon request)	NP/SW		
CT ETPH	Conn - Ext. Total petroleum Hydrocarbons (GC)	NP/SW		NP/SW
MA-EPH	Mass - Extractable Petroleum Hydrocarbons (GC)	NP/SW		
524.2	Volatile Org Comp (GC/MS)(list upon request)	P	P	
524.2	Trihalomethane compounds	P	P	
624	Volatile Org Comp (GC/MS)(list upon request)	NP	NP	
5035	Closed System Purge and Trap	SW		
5030B	Purge and Trap	NP		
8260B/C	Volatile Org Comp. (GC/MS)(list upon request)	NP/SW		
MAVPH	Mass - Volatile Petroleum Hydrocarbons (GC)			
180.1	Turbidity, Nephelometric	P	P	
300	Anions, Ion Chromatography	NP/P	NP/P	
410.4	COD	NP	NP	
1010	Ignitability, Pensky-Martens Closed-Cup Method	SW		
10-107-06-2	Nitrogen, Total Kjeldahl	NP	NP	
7196A	Chromium, Hexavalent	NP/SW		
9012A	Cyanide, Total and/or Amenable	NP/SW		
9030B	Sulfide, Distillation (Acid Soluble and Insoluble)	NP		
9045C	pH	SW		
L107041C	Nitrogen, Nitrate	NP	P	
L107-06-1B	Nitrogen Ammonia	NP	NP	
L204001A CN	Cyanide, Total	P	NP/P	
L210-001A	Phenolics, Total Recoverable	NP	NP	
SM 2320B	Alkalinity	NP/P	NP/P	
SM 2510B	Conductivity, Specific Conductance	NP/P	NP/P	
SM 2540C	Solids, Total Dissolved (TDS)	NP/P	NP/P	
SM 2540D	Solids, Total Suspended (TSS)	NP	NP	
SM 3500 CR D	Chromium, Hexavalent	NP		
SM 4500 H+ B	pH	NP/P	NP/P	
SM 4500 NO2 B	Nitrogen, Nitrite	NP	P	
SM 4500 P E	Phosphorus, Orthophosphate	NP/P	NP	
SM 4500 P E	Phosphorus, Total	NP	NP	
SM 4500 S2 D	Sulfide, Total	NP		
SM 5210B	BOD, 5-Day	NP	NP	
SM 5310B	Organic Carbon, Total (TOC)	NP/P	NP	

Not all organic compounds are accreditied under NELAC
For methods with multiple compounds all compounds may not meet NELAC criteria, listing should be obtained from the laboratory
The lab carries additional accreditations with several states. This is the laboratories typcial listing but is subject to change based on the laboratories current certification standing.

Login Sample Receipt Checklist

Client: Olin Corporation

Job Number: 360-37552-1

Login Number: 37552

List Source: TestAmerica Westfield

List Number: 1

Creator: Ard, Vanessa L

Question	Answer	Comment
Radioactivity either was not measured or, if measured, is at or below background	N/A	
The cooler's custody seal, if present, is intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

GW

TestAmerica Westfield
Westfield Executive Park 53 Southampton Road
Westfield, MA 01085
Phone (413) 572-4000 Fax (413) 572-3707

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Brian F/Chris M	Lab PM: Becky Mason	Carrier Tracking No(s):	COC No: 017508
Client Contact: James Cashwell	Phone:	E-Mail:		Page:
Company: Olin Corporation				Job #:
Address: 51 Eames St	Due Date Requested:			
City: Wilmington	TAT Requested (days):			
State, Zip: MA 01887				
Phone:	Quote #:			
Email:	PO #:			
Project Name/number: Olin Semiannual GW Sampling	WO #:			
Site: Olin Wilmington MA	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL; B - NaOH; C - Zn Acetate; D - Nitric Acid; E - NaHSO4; F - MeOH; H - Ascorbic Acid; I - Ice; J - DI Water; M - Hexane; N - None; P - Na2O4S; Q - Na2SO3; R - Na2S2SO3; S - H2SO4; Z - other (specify)

Regulatory programs: MCP ☐ GW1/S1 ☐ RCP ☐ CT RSR ☐ DEP Form ☐ EDD Required ☐

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Sampler's initials	Field Filtered Sample?	Perform MS/MSD?	Ammonia Leach	Chloride/SO4/Cake/Sp Cond	Dis Al/Cr* Full Filtered	Total Number of containers	Special Instructions/Note:
Preservation Code:								S	N	D		
OC-GW-CA1	11/10/11	1050	G	GW	CTM	Y	N	X	X	X	3	
OC-GW-42S	11/10/11	0950	G	GW	CTM	Y	N	X	X	X	3	
OC-GW-43SR	11/10/11	0845	G	GW	CTM	Y	N	X	X	X	3	
OC-GW-34SR	11/10/11	1135	G	GW	CTM	Y	N	X	X	X	3	
OC-GW-34D	11/10/11	1220	G	GW	CTM	Y	N	X	X	X	3	
OC-GW-202S	11/10/11	1010	G	GW	BEC	Y	N	X	X	X	3	
OC-GW-202D	11/10/11	0935	G	GW	BEC	Y	N	X	X	X	3	
OC-PZ-24	11/10/11	1110	G	GW	BEC	Y	N	X	X	X	3	
OC-PZ-25	11/10/11	1140	G	GW	BEC	Y	N	X	X	X	3	

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Relinquished by:	Date/Time: 11/10/11 1500	Company: AMEC	Received by:	Date/Time: 11-10-11 1500	Company
Relinquished by:	Date/Time: 11-10-11 1820	Company	Received by:	Date/Time: 11/10/11 1820	Company
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: Δ Yes Δ No | Custody Seal No.: | Cooler Temperature(s) °C and Other Remarks: N/A

12/2/2011

TAL-8245-360 0310

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TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Westfield
Westfield Executive Park
53 Southampton Road
Westfield, MA 01085
Tel: (413)572-4000

CHECKED FOR COMPLETENESS OF PARAMETERS ORDERED BY:

TestAmerica Job ID: 360-37595-1
Client Project/Site: Olin Chemical

For:
Olin Corporation
PO BOX 248
Charleston, Tennessee 37310-0248

Attn: Mr. James Cashwell

Authorized for release by:
11/30/2011 3:39:38 PM
Chris Reynolds
QA Manager
chris.reynolds@testamericainc.com

Designee for

Becky Mason
Project Manager II
becky.mason@testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Client: Olin Corporation
Project/Site: Olin Chemical

TestAmerica Job ID: 360-37595-1

Job ID: 360-37595-1

Laboratory: TestAmerica Westfield

Narrative

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

TestAmerica's Reporting Limits (RLs) for this report may not always meet WSC-CAM-III method reporting limits due to various reasons such as methodology, dilutions or moisture content (soils). TestAmerica's MA pivot table EDD documents which compound(s) exceed certain regulatory standards. If not included with your deliverables, please contact your Project Manager about the availability of this EDD for your report.

RECEIPT

The samples were received on 11/11/2011; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 6.0 C.

Note: All samples that require thermal preservation are considered acceptable if the arrival temperature is within the method's specified temperature range or for general analysis, ranging from 6°C to just above the freezing temperature of water. Samples that are hand delivered, immediately following collection, may not meet these criteria; however, they will be considered acceptable according to NELAC and State standards, if there is evidence that the chilling process has begun, such as stored and transported to the laboratory on ice.

TOTAL METALS (ICP)

Samples OC-SD-SD1-0.0/0.5 (360-37595-1), OC-SD-SD2-0.0/0.5 (360-37595-2), OC-SD-SD3-0.0/0.5 (360-37595-3), OC-SD-SD3 DUP-0.0/0.5 (360-37595-4), OC-SD-SD4-0.0/0.5 (360-37595-5) and OC-SD-SD5-0.0/0.5 (360-37595-6) were analyzed for total metals (ICP) in accordance with EPA SW-846 Method 6010B. The samples were prepared on 11/16/2011 and 11/21/2011 and analyzed on 11/18/2011 and 11/21/2011.

Aluminum and Iron were detected in method blank MB 360-83454/1-A at levels that were above the method detection limit but below the reporting limit. The values should be considered estimates, and have been flagged "J". If the associated sample reported a result above the MDL and/or RL, the result has been "B" flagged. Iron was detected in method blank MB 360-83671/1-A at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged "J". If the associated sample reported a result above the MDL and/or RL, the result has been "B" flagged. Refer to the QC report for details.

Aluminum and Iron failed the recovery criteria high for the MS of sample OC-SD-SD3-0.0/0.5MS (360-37595-3) in batch 360-83608.

Iron failed the recovery criteria low for the MSD of sample OC-SD-SD3-0.0/0.5MSD (360-37595-3) in batch 360-83608.

Iron failed the recovery criteria low for the MS of sample 360-37692-1 in batch 360-83721. Aluminum failed the recovery criteria high. The presence of the '4' qualifier in the report indicates analytes where the concentration in the unspiked sample exceeded four times the spiking amount. Refer to the QC report for details.

At the request of the client, an abbreviated/modified MCP analyte list was reported for this job.

No other difficulties were encountered during the metals analyses.

All other quality control parameters were within the acceptance limits.

PERCENT SOLIDS

Samples OC-SD-SD1-0.0/0.5 (360-37595-1), OC-SD-SD2-0.0/0.5 (360-37595-2), OC-SD-SD3-0.0/0.5 (360-37595-3), OC-SD-SD3 DUP-0.0/0.5 (360-37595-4), OC-SD-SD4-0.0/0.5 (360-37595-5) and OC-SD-SD5-0.0/0.5 (360-37595-6) were analyzed for percent solids in accordance with EPA Moisture. The samples were analyzed on 11/14/2011.

Job ID: 360-37595-1 (Continued)

Laboratory: TestAmerica Westfield (Continued)

No difficulties were encountered during the % solids analyses.

All quality control parameters were within the acceptance limits.

MassDEP Analytical Protocol Certification Form

Laboratory Name: **TestAmerica Westfield** Project #: **360-37595-1**

Project Location: **Wilmington MA** RTN:

This form provides certifications for the following data set: list Laboratory Sample ID Number(s):

360-37595-1 [1-8]

Matrices: ☐ Groundwater/Surface Water ☒ Soil/Sediment ☐ Drinking Water ☐ Air ☐ Other:

CAM Protocols (check all that apply below):

8260 VOC CAM II A ☐	7470/7471 Hg CAM III B ☐	Mass DEP VPH CAM IV A ☐	8081 Pesticides CAM V B ☐	7196 Hex Cr CAM VI B ☐	Mass DEP APH CAM IX A ☐
8270 SVOC CAM II B ☐	7010 Metals CAM III C ☐	Mass DEP EPH CAM IV B ☐	8151 Herbicides CAM V C ☐	8330 Explosives CAM VIII A ☐	TO-15 VOC CAM IX B ☐
6010 Metals CAM III A ☒	6020 Metals CAM III D ☐	8082 PCB CAM V A ☐	9014 Total Cyanide/PAC CAM VI A ☐	332.0 Perchlorate CAM VIII B ☐	

Affirmative Responses to Questions A through F are required for "Presumptive Certainty" status

A	Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding time.	☒ Yes ☐ No
B	Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed?	☒ Yes ☐ No
C	Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances?	☒ Yes ☐ No
D	Does the laboratory report comply with all the reporting requirements specified in CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	☒ Yes ☐ No
E	a. VPH, EPH and APH Methods only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications). b. APH and TO-15 Methods only: Was the complete analyte list reported for each method?	☐ Yes ☐ No ☐ Yes ☐ No
F	Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to Questions A through E)?	☒ Yes ☐ No

Responses to Questions G, H and I below are required for "Presumptive Certainty" status

G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)?	☒ Yes ☐ No[1]

***Data User Note:* Data that achieve "Presumptive Certainty" status may not necessarily meet the data usability and representativeness requirements described in 310 CMR 40. 1056 (2)(k) and WCS-07-350**

H	Were **all** QC performance standards specified in the CAM protocol(s) achieved?	☐ Yes ☒ No
I	Were results reported for the complete analyte list specified in the selected CAM protocol(s) ?	☐ Yes ☒ No

[1] All negative responses must be addressed in an attached laboratory narrative.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, is accurate and complete.

Signature: Christine Lucinda Reynolds Position: Quality Assurance Manager

Printed Name: Christine Reynolds Date: 11/30/11 15:32

This form has been electronically signed and approved

Detection Summary

Client: Olin Corporation
Project/Site: Olin Chemical

TestAmerica Job ID: 360-37595-1

Client Sample ID: OC-SD-SD1-0.0/0.5 — Lab Sample ID: 360-37595-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	11000	B	13	1.8	mg/Kg	1	☼	6010B	Total/NA
Chromium	30		0.84	0.42	mg/Kg	1	☼	6010B	Total/NA
Iron	13000	B	30	1.6	mg/Kg	1	☼	6010B	Total/NA

Client Sample ID: OC-SD-SD2-0.0/0.5 — Lab Sample ID: 360-37595-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	11000	B	11	1.6	mg/Kg	1	☼	6010B	Total/NA
Chromium	130		0.72	0.36	mg/Kg	1	☼	6010B	Total/NA
Iron	14000	B	25	1.4	mg/Kg	1	☼	6010B	Total/NA

Client Sample ID: OC-SD-SD3-0.0/0.5 — Lab Sample ID: 360-37595-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	9700	B	13	1.8	mg/Kg	1	☼	6010B	Total/NA
Chromium	35		0.84	0.42	mg/Kg	1	☼	6010B	Total/NA
Iron	14000	B	29	1.6	mg/Kg	1	☼	6010B	Total/NA

Client Sample ID: OC-SD-SD3 DUP-0.0/0.5 — Lab Sample ID: 360-37595-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	9800		11	1.6	mg/Kg	1	☼	6010B	Total/NA
Chromium	45		0.73	0.37	mg/Kg	1	☼	6010B	Total/NA
Iron	14000	B	26	1.4	mg/Kg	1	☼	6010B	Total/NA

Client Sample ID: OC-SD-SD4-0.0/0.5 — Lab Sample ID: 360-37595-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	9900	B	14	2.1	mg/Kg	1	☼	6010B	Total/NA
Chromium	140		0.95	0.48	mg/Kg	1	☼	6010B	Total/NA
Iron	17000	B	33	1.8	mg/Kg	1	☼	6010B	Total/NA

Client Sample ID: OC-SD-SD5-0.0/0.5 — Lab Sample ID: 360-37595-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	11000		11	1.7	mg/Kg	1	☼	6010B	Total/NA
Chromium	59		0.76	0.38	mg/Kg	1	☼	6010B	Total/NA
Iron	15000	B	27	1.4	mg/Kg	1	☼	6010B	Total/NA

Method Summary

Client: Olin Corporation
Project/Site: Olin Chemical

TestAmerica Job ID: 360-37595-1

Method	Method Description	Protocol	Laboratory
6010B	Metals (ICP)	SW846	TAL WFD
Moisture	Percent Moisture	EPA	TAL WFD

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL WFD = TestAmerica Westfield, Westfield Executive Park, 53 Southampton Road, Westfield, MA 01085, TEL (413)572-4000

Sample Summary

Client: Olin Corporation
Project/Site: Olin Chemical

TestAmerica Job ID: 360-37595-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
360-37595-1	OC-SD-SD1-0.0/0.5	Solid	11/11/11 12:35	11/11/11 17:25
360-37595-2	OC-SD-SD2-0.0/0.5	Solid	11/11/11 12:20	11/11/11 17:25
360-37595-3	OC-SD-SD3-0.0/0.5	Solid	11/11/11 12:10	11/11/11 17:25
360-37595-4	OC-SD-SD3 DUP-0.0/0.5	Solid	11/11/11 12:10	11/11/11 17:25
360-37595-5	OC-SD-SD4-0.0/0.5	Solid	11/11/11 12:00	11/11/11 17:25
360-37595-6	OC-SD-SD5-0.0/0.5	Solid	11/11/11 11:50	11/11/11 17:25

Method: 6010B - Metals (ICP)

Client Sample ID: OC-SD-SD1-0.0/0.5
Date Collected: 11/11/11 12:35
Date Received: 11/11/11 17:25

Lab Sample ID: 360-37595-1
Matrix: Solid
Percent Solids: 71.5

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	11000	B	13	1.8	mg/Kg	☼	11/16/11 12:50	11/18/11 12:26	1
Chromium	30		0.84	0.42	mg/Kg	☼	11/16/11 12:50	11/18/11 12:26	1
Iron	13000	B	30	1.6	mg/Kg	☼	11/16/11 12:50	11/18/11 12:26	1

Client Sample ID: OC-SD-SD2-0.0/0.5
Date Collected: 11/11/11 12:20
Date Received: 11/11/11 17:25

Lab Sample ID: 360-37595-2
Matrix: Solid
Percent Solids: 75.0

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	11000	B	11	1.6	mg/Kg	☼	11/16/11 12:50	11/18/11 12:29	1
Chromium	130		0.72	0.36	mg/Kg	☼	11/16/11 12:50	11/18/11 12:29	1
Iron	14000	B	25	1.4	mg/Kg	☼	11/16/11 12:50	11/18/11 12:29	1

Client Sample ID: OC-SD-SD3-0.0/0.5
Date Collected: 11/11/11 12:10
Date Received: 11/11/11 17:25

Lab Sample ID: 360-37595-3
Matrix: Solid
Percent Solids: 72.3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	9700	B	13	1.8	mg/Kg	☼	11/16/11 12:50	11/18/11 12:11	1
Chromium	35		0.84	0.42	mg/Kg	☼	11/16/11 12:50	11/18/11 12:11	1
Iron	14000	B	29	1.6	mg/Kg	☼	11/16/11 12:50	11/18/11 12:11	1

Client Sample ID: OC-SD-SD3 DUP-0.0/0.5
Date Collected: 11/11/11 12:10
Date Received: 11/11/11 17:25

Lab Sample ID: 360-37595-4
Matrix: Solid
Percent Solids: 74.2

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	9800		11	1.6	mg/Kg	☼	11/21/11 10:33	11/21/11 18:10	1
Chromium	45		0.73	0.37	mg/Kg	☼	11/21/11 10:33	11/21/11 18:10	1
Iron	14000	B	26	1.4	mg/Kg	☼	11/21/11 10:33	11/21/11 18:10	1

Client Sample ID: OC-SD-SD4-0.0/0.5
Date Collected: 11/11/11 12:00
Date Received: 11/11/11 17:25

Lab Sample ID: 360-37595-5
Matrix: Solid
Percent Solids: 65.7

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	9900	B	14	2.1	mg/Kg	☼	11/16/11 12:50	11/18/11 12:32	1
Chromium	140		0.95	0.48	mg/Kg	☼	11/16/11 12:50	11/18/11 12:32	1
Iron	17000	B	33	1.8	mg/Kg	☼	11/16/11 12:50	11/18/11 12:32	1

Client Sample ID: OC-SD-SD5-0.0/0.5
Date Collected: 11/11/11 11:50
Date Received: 11/11/11 17:25

Lab Sample ID: 360-37595-6
Matrix: Solid
Percent Solids: 73.3

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	11000		11	1.7	mg/Kg	☼	11/21/11 10:33	11/21/11 18:13	1
Chromium	59		0.76	0.38	mg/Kg	☼	11/21/11 10:33	11/21/11 18:13	1
Iron	15000	B	27	1.4	mg/Kg	☼	11/21/11 10:33	11/21/11 18:13	1

General Chemistry

Client Sample ID: OC-SD-SD1-0.0/0.5
Date Collected: 11/11/11 12:35
Date Received: 11/11/11 17:25

Lab Sample ID: 360-37595-1
Matrix: Solid

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	29		1.0	1.0	%			11/14/11 10:27	1
Percent Solids	71		1.0	1.0	%			11/14/11 10:27	1

Client Sample ID: OC-SD-SD2-0.0/0.5
Date Collected: 11/11/11 12:20
Date Received: 11/11/11 17:25

Lab Sample ID: 360-37595-2
Matrix: Solid

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	25		1.0	1.0	%			11/14/11 10:27	1
Percent Solids	75		1.0	1.0	%			11/14/11 10:27	1

Client Sample ID: OC-SD-SD3-0.0/0.5
Date Collected: 11/11/11 12:10
Date Received: 11/11/11 17:25

Lab Sample ID: 360-37595-3
Matrix: Solid

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	28		1.0	1.0	%			11/14/11 10:27	1
Percent Solids	72		1.0	1.0	%			11/14/11 10:27	1

Client Sample ID: OC-SD-SD3 DUP-0.0/0.5
Date Collected: 11/11/11 12:10
Date Received: 11/11/11 17:25

Lab Sample ID: 360-37595-4
Matrix: Solid

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	26		1.0	1.0	%			11/14/11 10:27	1
Percent Solids	74		1.0	1.0	%			11/14/11 10:27	1

Client Sample ID: OC-SD-SD4-0.0/0.5
Date Collected: 11/11/11 12:00
Date Received: 11/11/11 17:25

Lab Sample ID: 360-37595-5
Matrix: Solid

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	34		1.0	1.0	%			11/14/11 10:27	1
Percent Solids	66		1.0	1.0	%			11/14/11 10:27	1

Client Sample ID: OC-SD-SD5-0.0/0.5
Date Collected: 11/11/11 11:50
Date Received: 11/11/11 17:25

Lab Sample ID: 360-37595-6
Matrix: Solid

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	27		1.0	1.0	%			11/14/11 10:27	1
Percent Solids	73		1.0	1.0	%			11/14/11 10:27	1

Definitions/Glossary

Client: Olin Corporation
Project/Site: Olin Chemical

TestAmerica Job ID: 360-37595-1

Qualifiers

Metals

Qualifier	Qualifier Description
B	Compound was found in the blank and sample.
4	MS, MSD: The analyte present in the original sample is 4 times greater than the matrix spike concentration; therefore, control limits are not applicable.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
☼	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CNF	Contains no Free Liquid
DL, RA, RE, IN	Indicates a Dilution, Reanalysis, Re-extraction, or additional Initial metals/anion analysis of the sample
EDL	Estimated Detection Limit
EPA	United States Environmental Protection Agency
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
RL	Reporting Limit
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Metals

Prep Batch: 83454

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37595-1	OC-SD-SD1-0.0/0.5	Total/NA	Solid	3050B	
360-37595-2	OC-SD-SD2-0.0/0.5	Total/NA	Solid	3050B	
360-37595-3	OC-SD-SD3-0.0/0.5	Total/NA	Solid	3050B	
360-37595-3 MS	OC-SD-SD3-0.0/0.5	Total/NA	Solid	3050B	
360-37595-3 MSD	OC-SD-SD3-0.0/0.5	Total/NA	Solid	3050B	
360-37595-5	OC-SD-SD4-0.0/0.5	Total/NA	Solid	3050B	
LCDSRM 360-83454/3-A LCDSI	Lab Control Sample Dup	Total/NA	Solid	3050B	
LCSSRM 360-83454/2-A	Lab Control Sample	Total/NA	Solid	3050B	
MB 360-83454/1-A	Method Blank	Total/NA	Solid	3050B	

Analysis Batch: 83608

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37595-1	OC-SD-SD1-0.0/0.5	Total/NA	Solid	6010B	83454
360-37595-2	OC-SD-SD2-0.0/0.5	Total/NA	Solid	6010B	83454
360-37595-3	OC-SD-SD3-0.0/0.5	Total/NA	Solid	6010B	83454
360-37595-3 MS	OC-SD-SD3-0.0/0.5	Total/NA	Solid	6010B	83454
360-37595-3 MSD	OC-SD-SD3-0.0/0.5	Total/NA	Solid	6010B	83454
360-37595-5	OC-SD-SD4-0.0/0.5	Total/NA	Solid	6010B	83454
LCDSRM 360-83454/3-A LCDSI	Lab Control Sample Dup	Total/NA	Solid	6010B	83454
LCSSRM 360-83454/2-A	Lab Control Sample	Total/NA	Solid	6010B	83454
MB 360-83454/1-A	Method Blank	Total/NA	Solid	6010B	83454

Prep Batch: 83671

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37595-4	OC-SD-SD3 DUP-0.0/0.5	Total/NA	Solid	3050B	
360-37595-6	OC-SD-SD5-0.0/0.5	Total/NA	Solid	3050B	
LCDSRM 360-83671/3-A LCDSI	Lab Control Sample Dup	Total/NA	Solid	3050B	
LCSSRM 360-83671/2-A	Lab Control Sample	Total/NA	Solid	3050B	
MB 360-83671/1-A	Method Blank	Total/NA	Solid	3050B	

Analysis Batch: 83721

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37595-4	OC-SD-SD3 DUP-0.0/0.5	Total/NA	Solid	6010B	83671
360-37595-6	OC-SD-SD5-0.0/0.5	Total/NA	Solid	6010B	83671
LCDSRM 360-83671/3-A LCDSI	Lab Control Sample Dup	Total/NA	Solid	6010B	83671
LCSSRM 360-83671/2-A	Lab Control Sample	Total/NA	Solid	6010B	83671
MB 360-83671/1-A	Method Blank	Total/NA	Solid	6010B	83671

General Chemistry

Analysis Batch: 83312

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37595-1	OC-SD-SD1-0.0/0.5	Total/NA	Solid	Moisture	
360-37595-2	OC-SD-SD2-0.0/0.5	Total/NA	Solid	Moisture	
360-37595-3	OC-SD-SD3-0.0/0.5	Total/NA	Solid	Moisture	
360-37595-3 MS	OC-SD-SD3-0.0/0.5	Total/NA	Solid	Moisture	
360-37595-3 MSD	OC-SD-SD3-0.0/0.5	Total/NA	Solid	Moisture	
360-37595-4	OC-SD-SD3 DUP-0.0/0.5	Total/NA	Solid	Moisture	
360-37595-5	OC-SD-SD4-0.0/0.5	Total/NA	Solid	Moisture	
360-37595-6	OC-SD-SD5-0.0/0.5	Total/NA	Solid	Moisture	

Method: 6010B - Metals (ICP)

Lab Sample ID: MB 360-83454/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 83608 — **Prep Batch: 83454**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	6.36	J	7.5	1.1	mg/Kg		11/16/11 12:50	11/18/11 11:57	1
Chromium	ND		0.50	0.25	mg/Kg		11/16/11 12:50	11/18/11 11:57	1
Iron	16.0	J	18	0.94	mg/Kg		11/16/11 12:50	11/18/11 11:57	1

Lab Sample ID: LCDSRM 360-83454/3-A LCDSRM — **Client Sample ID: Lab Control Sample Dup**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 83608 — **Prep Batch: 83454**

Analyte			Spike Added	LCDSRM Result	LCDSRM Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum			7740	13000		mg/Kg		169	89.9 - 279	1	30
Chromium			272	242		mg/Kg		89	68.0 - 124	0	30
Iron			13100	20400		mg/Kg		156	68.6 - 239	1	30

Lab Sample ID: LCSSRM 360-83454/2-A — **Client Sample ID: Lab Control Sample**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 83608 — **Prep Batch: 83454**

Analyte			Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum			7740	13200		mg/Kg		170	89.9 - 279
Chromium			272	243		mg/Kg		89	68.0 - 124
Iron			13100	20200		mg/Kg		154	68.6 - 239

Lab Sample ID: 360-37595-3 MS — **Client Sample ID: OC-SD-SD3-0.0/0.5**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 83608 — **Prep Batch: 83454**

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	9700	B	417	10600	4	mg/Kg	☼	224	75 - 125
Chromium	35		83.3	139		mg/Kg	☼	125	75 - 125
Iron	14000	B	417	15900	4	mg/Kg	☼	494	75 - 125

Lab Sample ID: 360-37595-3 MSD — **Client Sample ID: OC-SD-SD3-0.0/0.5**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 83608 — **Prep Batch: 83454**

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	9700	B	422	10000	4	mg/Kg	☼	79	75 - 125	6	35
Chromium	35		84.3	130		mg/Kg	☼	113	75 - 125	7	35
Iron	14000	B	422	13300	4	mg/Kg	☼	-124	75 - 125	18	35

Lab Sample ID: MB 360-83671/1-A — **Client Sample ID: Method Blank**
Matrix: Solid — **Prep Type: Total/NA**
Analysis Batch: 83721 — **Prep Batch: 83671**

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		7.5	1.1	mg/Kg		11/21/11 10:33	11/21/11 17:20	1
Chromium	ND		0.50	0.25	mg/Kg		11/21/11 10:33	11/21/11 17:20	1
Iron	1.75	J	18	0.94	mg/Kg		11/21/11 10:33	11/21/11 17:20	1

Method: 6010B - Metals (ICP) (Continued)

Lab Sample ID: LCDSRM 360-83671/3-A LCDSRM
Matrix: Solid
Analysis Batch: 83721

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 83671

Analyte	Spike Added	LCDSRM Result	LCDSRM Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	7740	17100		mg/Kg		221	89.9 - 279	12	30
Chromium	272	255		mg/Kg		94	68.0 - 124	5	30
Iron	13100	23000		mg/Kg		176	68.6 - 239	5	30

Lab Sample ID: LCSSRM 360-83671/2-A
Matrix: Solid
Analysis Batch: 83721

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 83671

Analyte	Spike Added	LCSSRM Result	LCSSRM Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	7740	15200		mg/Kg		197	89.9 - 279
Chromium	272	267		mg/Kg		98	68.0 - 124
Iron	13100	21900		mg/Kg		167	68.6 - 239

Lab Chronicle

Client: Olin Corporation
Project/Site: Olin Chemical

TestAmerica Job ID: 360-37595-1

Client Sample ID: OC-SD-SD1-0.0/0.5

Lab Sample ID: 360-37595-1
Date Collected: 11/11/11 12:35
Matrix: Solid
Date Received: 11/11/11 17:25
Percent Solids: 71.5

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			83454	11/16/11 12:50	OG	TAL WFD
Total/NA	Analysis	6010B		1	83608	11/18/11 12:26	TJS	TAL WFD
Total/NA	Analysis	Moisture		1	83312	11/14/11 10:27	OG	TAL WFD

Client Sample ID: OC-SD-SD2-0.0/0.5

Lab Sample ID: 360-37595-2
Date Collected: 11/11/11 12:20
Matrix: Solid
Date Received: 11/11/11 17:25
Percent Solids: 75.0

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			83454	11/16/11 12:50	OG	TAL WFD
Total/NA	Analysis	6010B		1	83608	11/18/11 12:29	TJS	TAL WFD
Total/NA	Analysis	Moisture		1	83312	11/14/11 10:27	OG	TAL WFD

Client Sample ID: OC-SD-SD3-0.0/0.5

Lab Sample ID: 360-37595-3
Date Collected: 11/11/11 12:10
Matrix: Solid
Date Received: 11/11/11 17:25
Percent Solids: 72.3

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			83454	11/16/11 12:50	OG	TAL WFD
Total/NA	Analysis	6010B		1	83608	11/18/11 12:11	TJS	TAL WFD
Total/NA	Analysis	Moisture		1	83312	11/14/11 10:27	OG	TAL WFD

Client Sample ID: OC-SD-SD3 DUP-0.0/0.5

Lab Sample ID: 360-37595-4
Date Collected: 11/11/11 12:10
Matrix: Solid
Date Received: 11/11/11 17:25
Percent Solids: 74.2

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			83671	11/21/11 10:33	EMN	TAL WFD
Total/NA	Analysis	6010B		1	83721	11/21/11 18:10	TJS	TAL WFD
Total/NA	Analysis	Moisture		1	83312	11/14/11 10:27	OG	TAL WFD

Client Sample ID: OC-SD-SD4-0.0/0.5

Lab Sample ID: 360-37595-5
Date Collected: 11/11/11 12:00
Matrix: Solid
Date Received: 11/11/11 17:25
Percent Solids: 65.7

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			83454	11/16/11 12:50	OG	TAL WFD
Total/NA	Analysis	6010B		1	83608	11/18/11 12:32	TJS	TAL WFD
Total/NA	Analysis	Moisture		1	83312	11/14/11 10:27	OG	TAL WFD

Lab Chronicle

Client: Olin Corporation
Project/Site: Olin Chemical

TestAmerica Job ID: 360-37595-1

Client Sample ID: OC-SD-SD5-0.0/0.5
Date Collected: 11/11/11 11:50
Date Received: 11/11/11 17:25

Lab Sample ID: 360-37595-6
Matrix: Solid
Percent Solids: 73.3

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3050B			83671	11/21/11 10:33	EMN	TAL WFD
Total/NA	Analysis	6010B		1	83721	11/21/11 18:13	TJS	TAL WFD
Total/NA	Analysis	Moisture		1	83312	11/14/11 10:27	OG	TAL WFD

Laboratory References:

TAL WFD = TestAmerica Westfield, Westfield Executive Park, 53 Southampton Road, Westfield, MA 01085, TEL (413)572-4000

Certification Summary

Client: Olin Corporation
Project/Site: Olin Chemical

TestAmerica Job ID: 360-37595-1

Laboratory	Authority	Program	EPA Region	Certification ID
TestAmerica Westfield	Connecticut	State Program	1	PH-0494
TestAmerica Westfield	Maine	State Program	1	MA00014
TestAmerica Westfield	Massachusetts	State Program	1	M-MA014
TestAmerica Westfield	New Hampshire	NELAC	1	2539
TestAmerica Westfield	New York	NELAC	2	10843
TestAmerica Westfield	North Carolina	North Carolina DENR	4	647
TestAmerica Westfield	Rhode Island	State Program	1	LAO00057

Accreditation may not be offered or required for all methods and analytes reported in this package. Please contact your project manager for the laboratory's current list of certified methods and analytes.

State Accreditation Matrix

Method Name	Description	State where **Primary** Accreditation is Carried		
		New Hampshire (NELAC)	Mass	Conn
821-R-02-012	Toxicity, Acute (48-Hour)(list upon request)	NP		
SM 4500 Cl F	Chlorine, Residual		NP	
SM 9215E	Heterotrophic Plate Count (SimPlate)		P	
SM 9222D	Coliforms, Fecal (Membrane Filter)		P/NP	
SM 9223	Coliforms, Total, and E.Coli (Colilert-P/A)		P	
SM 9224	Coliforms, Total, and E.Coli (Enumeration)		P	
1103.1	E.coli		ambient/ source	
Enterolert	Enterococcus			
200.8 Rev 5.4	Metals (ICP/MS) (list upon request)	NP/P	NP/P	
200.7 Rev 4.4	Metals (ICP)(list upon request)	NP/P	NP/P	
6010B/C	Metals (ICP)(list upon request)	NP/SW		
245.1	Mercury (CVAA)	NP/P	NP	
7470A	Mercury (CVAA)	NP		
7471A	Mercury (CVAA)	SW		
SM 2340B	Total Hardness (as CaCO3) by calculation	NP/P	NP	
3005A	Preparation, Total Recoverable or Dissolved Metals	NP/P		
3010A	Preparation, Total Metals	NP/P		
3020A	Preparation, Total Metals	NP/P/SW		
3050B	Preparation, Metals	SW		
504.1	EDB, DBCP and 1,2,3-TCP (GC)	P	P	
608	Organochlorine Pest/PCBs (list upon request)	NP	NP	
625	Semivolatile Org Comp (GC/MS)(list upon request)	NP	NP	
3546	Microwave Extraction	SW		
3510C	Liquid-Liquid Extraction (Separatory Funnel)	NP		
3550B	Ultrasonic Extraction	SW		
8081AB	Organochlorine Pesticides (GC)(list upon request)	NP/SW		
8082/A	PCBs by Gas Chromatography(list upon request)	NP/SW		
8270C/D	Semivolatile Comp.(GC/MS)(list upon request)	NP/SW		
CT ETPH	Conn - Ext. Total petroleum Hydrocarbons (GC)	NP/SW		NP/SW
MA-EPH	Mass - Extractable Petroleum Hydrocarbons (GC)	NP/SW		
524.2	Volatile Org Comp (GC/MS)(list upon request)	P	P	
524.2	Trihalomethane compounds	P	P	
624	Volatile Org Comp (GC/MS)(list upon request)	NP	NP	
5035	Closed System Purge and Trap	SW		
5030B	Purge and Trap	NP		
8260B/C	Volatile Org Comp. (GC/MS)(list upon request)	NP/SW		
MAVPH	Mass - Volatile Petroleum Hydrocarbons (GC)			
180.1	Turbidity, Nephelometric	P	P	
300	Anions, Ion Chromatography	NP/P	NP/P	
410.4	COD	NP	NP	
1010	Ignitability, Pensky-Martens Closed-Cup Method	SW		
10-107-06-2	Nitrogen, Total Kjeldahl	NP	NP	
7196A	Chromium, Hexavalent	NP/SW		
9012A	Cyanide, Total and/or Amenable	NP/SW		
9030B	Sulfide, Distillation (Acid Soluble and Insoluble)	NP		
9045C	pH	SW		
L107041C	Nitrogen, Nitrate	NP	P	
L107-06-1B	Nitrogen Ammonia	NP	NP	
L204001A CN	Cyanide, Total	P	NP/P	
L210-001A	Phenolics, Total Recoverable	NP	NP	
SM 2320B	Alkalinity	NP/P	NP/P	
SM 2510B	Conductivity, Specific Conductance	NP/P	NP/P	
SM 2540C	Solids, Total Dissolved (TDS)	NP/P	NP/P	
SM 2540D	Solids, Total Suspended (TSS)	NP	NP	
SM 3500 CR D	Chromium, Hexavalent	NP		
SM 4500 H+ B	pH	NP/P	NP/P	
SM 4500 NO2 B	Nitrogen, Nitrite	NP	P	
SM 4500 P E	Phosphorus, Orthophosphate	NP/P	NP	
SM 4500 P E	Phosphorus, Total	NP	NP	
SM 4500 S2 D	Sulfide, Total	NP		
SM 5210B	BOD, 5-Day	NP	NP	
SM 5310B	Organic Carbon, Total (TOC)	NP/P	NP	

Not all organic compounds are accreditied under NELAC
For methods with multiple compounds all compounds may not meet NELAC criteria, listing should be obtained from the laboratory
The lab carries additional accreditations with several states. This is the laboratories typcial listing but is subject to change based on the laboratories current certification standing.

Login Sample Receipt Checklist

Client: Olin Corporation

Job Number: 360-37595-1

Login Number: 37595

List Source: TestAmerica Westfield

List Number: 1

Creator: Ard, Vanessa L

Question	Answer	Comment
Radioactivity either was not measured or, if measured, is at or below background	N/A	
The cooler's custody seal, if present, is intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

SED

TestAmerica Westfield
Westfield Executive Park 53 Southampton Road
Westfield, MA 01085
Phone (413) 572-4000 Fax (413) 572-3707

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: Chris Mazzolini	Lab PM: Becky Mason	Carrier Tracking No(s):	COC No: 017512
Client Contact: James Cashwell	Phone:	E-Mail:		Page: 1 of 1
Company: Olin Corporation				Job #:
Address: 51 Eames St	Due Date Requested:			
City: Wilmington	TAT Requested (days): Standard			
State, Zip: MA 01887	Quote #:			
Phone:	PO #:			
Email:	WO #:			
Project Name/number: Olin Wilmington, MA	SSOW#:			
Site: Olin Semi Annual				

Analysis Requested

Preservation Codes:
A - HCL; B - NaOH; C - Zn Acetate; D - Nitric Acid; E - NaHSO4; F - MeOH; H - Ascorbic Acid; I - Ice; J - DI Water; M - Hexane; N - None; P - Na2O4S; Q - Na2SO3; R - Na2S2SO3; S - H2SO4; Z - other (specify)

Regulatory programs: MCP ☐ GW1/S1 ☐ RCP ☐ CT RSR ☐ DEP Form ☐ EDD Required ☐

Sample Identification	Sample Date	Sample Time	Sample Type (C=comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Sampler's Initials	Field Filtered Sample?	Perform MS/MSD?	Total Al / Cr / Fe 6010B	% Solids	Total Number of containers	Special Instructions/Note:
			Preservation Code:					N	N		
OC-SD-SD1-0.0/0.5	11/11/11	1235	G	S	CM	N	N	X	X	1	
OC-SD-SD2-0.0/0.5	11/11/11	1220	G	S	CM	N	N	X	X	1	
OC-SD-SD3-0.0/0.5	11/11/11	1210	G	S	CM	N	Y	X	X	1	
OC-SD-SD3 DUP-0.0/0.5	11/11/11	1210	G	S	CM	N	Y	X	X	1	
OC-SD-SD3 MS-0.0/0.5	11/11/11	1210	G	S	CM	N	Y	X	X	1	
OC-SD-SD3 MSD-0.0/0.5	11/11/11	1210	G	S	CM	N	Y	X	X	1	
OC-SD-SD4-0.0/0.5	11/11/11	1200	G	S	CM	N	N	X	X	1	
OC-SD-SD5-0.0/0.5	11/11/11	1150	G	S	CM	N	N	X	X	1	

TB 11/11/11

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For ____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	11/11/11 1500	AMEC		11/11/11 1500	
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	11/11/11 1725			11/11/11 1725	TA
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: ☐ Yes ☐ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks: 6.0°C w/ ice

TAL-8245-360 0310

11/30/2011

FILE COPY

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Westfield
Westfield Executive Park
53 Southampton Road
Westfield, MA 01085
Tel: (413)572-4000

CHECKED FOR COMPLETENESS OF PARAMETERS ORDERED BY:

TestAmerica Job ID: 360-37596-1
Client Project/Site: Olin Chemical

For:
Olin Corporation
PO BOX 248
Charleston, Tennessee 37310-0248

Attn: Mr. James Cashwell

Authorized for release by:
12/2/2011 2:40:31 PM
Chris Reynolds
QA Manager
chris.reynolds@testamericainc.com

Designee for

Becky Mason
Project Manager II
becky.mason@testamericainc.com

The test results in this report meet all 2003 NELAC and 2009 TNI requirements for accredited parameters, exceptions are noted in this report. This report may not be reproduced except in full, and with written approval from the laboratory. For questions please contact the Project Manager at the e-mail address or telephone number listed on this page.

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

Table of Contents

Client: Olin Corporation
Project/Site: Olin Chemical

TestAmerica Job ID: 360-37596-1

Job ID: 360-37596-1

Laboratory: TestAmerica Westfield

Narrative

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

RECEIPT

The samples were received on 11/11/2011; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 6.0 C.

Note: All samples that require thermal preservation are considered acceptable if the arrival temperature is within the method's specified temperature range or for general analysis, ranging from 6°C to just above the freezing temperature of water. Samples that are hand delivered, immediately following collection, may not meet these criteria; however, they will be considered acceptable according to NELAC and State standards, if there is evidence that the chilling process has begun, such as stored and transported to the laboratory on ice.

DISSOLVED METALS

Samples OC-GW-26 (360-37596-1), OC-GW-10s (360-37596-2), OC-GW-76s (360-37596-3), OC-GW-24 (360-37596-4) and OC-GW-25 (360-37596-5) were analyzed for dissolved metals in accordance with EPA SW-846 Method 6010B. The samples were analyzed on 11/23/2011.

At the request of the client, an abbreviated/modified MCP analyte list was reported for this job.

No difficulties were encountered during the dissolved metals analyses.

All quality control parameters were within the acceptance limits.

SPECIFIC CONDUCTIVITY

Samples OC-GW-26 (360-37596-1), OC-GW-10s (360-37596-2), OC-GW-76s (360-37596-3), OC-GW-24 (360-37596-4) and OC-GW-25 (360-37596-5) were analyzed for specific conductivity in accordance with SM20 2510B. The samples were analyzed on 11/19/2011.

At the request of the client, an abbreviated/modified MCP analyte list was reported for this job.

No difficulties were encountered during the conductivity analyses.

All quality control parameters were within the acceptance limits.

ANIONS (28 DAY HOLD TIME)

Samples OC-GW-26 (360-37596-1), OC-GW-10s (360-37596-2), OC-GW-76s (360-37596-3), OC-GW-24 (360-37596-4) and OC-GW-25 (360-37596-5) were analyzed for anions (28 day hold time) in accordance with EPA Method 300.0. The samples were analyzed on 11/21/2011.

Samples OC-GW-26 (360-37596-1)[10X] and OC-GW-25 (360-37596-5)[10X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No difficulties were encountered during the anions analyses.

All quality control parameters were within the acceptance limits.

AMMONIA

Samples OC-GW-26 (360-37596-1), OC-GW-10s (360-37596-2), OC-GW-76s (360-37596-3), OC-GW-24 (360-37596-4) and OC-GW-25

Job ID: 360-37596-1 (Continued)

Laboratory: TestAmerica Westfield (Continued)

(360-37596-5) were analyzed for ammonia in accordance with Lachat 107-06-1B. The samples were prepared and analyzed on 11/23/2011 and 11/30/2011.

Samples OC-GW-26 (360-37596-1)[10X], OC-GW-24 (360-37596-4)[4X] and OC-GW-25 (360-37596-5)[4X] required dilution prior to analysis. The reporting limits have been adjusted accordingly.

No other difficulties were encountered during the ammonia analyses.

All other quality control parameters were within the acceptance limits.

MassDEP Analytical Protocol Certification Form

Laboratory Name: **TestAmerica Westfield** Project #: **360-37596-1**

Project Location: **Wilmington Ma** RTN:

This form provides certifications for the following data set: list Laboratory Sample ID Number(s):

360-37596-1 [1-5]

Matrices: [X] Groundwater/Surface Water [ ] Soil/Sediment [ ] Drinking Water [ ] Air [ ] Other:

CAM Protocols (check all that apply below):

8260 VOC CAM II A [ ]	7470/7471 Hg CAM III B [ ]	Mass DEP VPH CAM IV A [ ]	8081 Pesticides CAM V B [ ]	7196 Hex Cr CAM VI B [ ]	Mass DEP APH CAM IX A [ ]
8270 SVOC CAM II B [ ]	7010 Metals CAM III C [ ]	Mass DEP EPH CAM IV B [ ]	8151 Herbicides CAM V C [ ]	8330 Explosives CAM VIII A [ ]	TO-15 VOC CAM IX B [ ]
6010 Metals CAM III A [X]	6020 Metals CAM III D [ ]	8082 PCB CAM V A [ ]	9014 Total Cyanide/PAC CAM VI A [ ]	332.0 Perchlorate CAM VIII B [ ]	

Affirmative Responses to Questions A through F are required for "Presumptive Certainty" status

A	Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding time.	[X] Yes [ ] No
B	Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed?	[X] Yes [ ] No
C	Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances?	[X] Yes [ ] No
D	Does the laboratory report comply with all the reporting requirements specified in CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	[X] Yes [ ] No
E	a. VPH, EPH and APH Methods only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications). b. APH and TO-15 Methods only: Was the complete analyte list reported for each method?	[ ] Yes [ ] No [ ] Yes [ ] No
F	Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to Questions A through E)?	[X] Yes [ ] No

Responses to Questions G, H and I below are required for "Presumptive Certainty" status

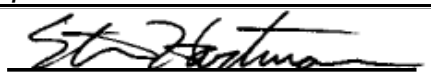
G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)?	[X] Yes [ ] No[1]

***Data User Note:* Data that achieve "Presumptive Certainty" status may not necessarily meet the data usability and representativeness requirements described in 310 CMR 40. 1056 (2)(k) and WCS-07-350**

H	Were **all** QC performance standards specified in the CAM protocol(s) achieved?	[X] Yes [ ] No
I	Were results reported for the complete analyte list specified in the selected CAM protocol(s) ?	[ ] Yes [X] No

[1] All negative responses must be addressed in an attached laboratory narrative.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, is accurate and complete.

Signature:  Position: Laboratory Director

Printed Name: Steven C. Hartmann Date: 12/2/11 14:34

This form has been electronically signed and approved

Detection Summary

Client: Olin Corporation
Project/Site: Olin Chemical

TestAmerica Job ID: 360-37596-1

Client Sample ID: OC-GW-26 — Lab Sample ID: 360-37596-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chromium	6.1		5.0	0.65	ug/L	1		6010B	Dissolved

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	32		2.0	2.0	mg/L	1		300.0	Total/NA
Chloride	330		10	10	mg/L	10		300.0	Total/NA
Ammonia	47		1.0	1.0	mg/L	10		L107-06-1B	Total/NA
Specific Conductance	1200		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

Client Sample ID: OC-GW-10s — Lab Sample ID: 360-37596-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Aluminum	3600		100	13	ug/L	1		6010B	Dissolved

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	69		2.0	2.0	mg/L	1		300.0	Total/NA
Chloride	20		1.0	1.0	mg/L	1		300.0	Total/NA
Ammonia	4.0		0.10	0.10	mg/L	1		L107-06-1B	Total/NA
Specific Conductance	220		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

Client Sample ID: OC-GW-76s — Lab Sample ID: 360-37596-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chromium	2.3	J	5.0	0.65	ug/L	1		6010B	Dissolved

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	38		2.0	2.0	mg/L	1		300.0	Total/NA
Chloride	4.3		1.0	1.0	mg/L	1		300.0	Total/NA
Ammonia	6.7		0.10	0.10	mg/L	1		L107-06-1B	Total/NA
Specific Conductance	150		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

Client Sample ID: OC-GW-24 — Lab Sample ID: 360-37596-4

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	53		2.0	2.0	mg/L	1		300.0	Total/NA
Chloride	13		1.0	1.0	mg/L	1		300.0	Total/NA
Ammonia	36		0.40	0.40	mg/L	4		L107-06-1B	Total/NA
Specific Conductance	340		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

Client Sample ID: OC-GW-25 — Lab Sample ID: 360-37596-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Chromium	2.4	J	5.0	0.65	ug/L	1		6010B	Dissolved

Analyte	Result	Qualifier	RL	RL	Unit	Dil Fac	D	Method	Prep Type
Sulfate	96		20	20	mg/L	10		300.0	Total/NA
Chloride	110		10	10	mg/L	10		300.0	Total/NA
Ammonia	36		0.40	0.40	mg/L	4		L107-06-1B	Total/NA
Specific Conductance	770		1.0	1.0	umhos/cm	1		SM 2510B	Total/NA

Method Summary

Client: Olin Corporation
Project/Site: Olin Chemical

TestAmerica Job ID: 360-37596-1

Method	Method Description	Protocol	Laboratory
6010B	Dissolved Metals	SW846	TAL WFD
300.0	Chloride & Sulfate	40CFR136A	TAL WFD
L107-06-1B	Nitrogen Ammonia	LACHAT	TAL WFD
SM 2510B	Conductivity, Specific Conductance	SM	TAL WFD

Protocol References:

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.
LACHAT = LACHAT

SM = "Standard Methods For The Examination Of Water And Wastewater",

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL WFD = TestAmerica Westfield, Westfield Executive Park, 53 Southampton Road, Westfield, MA 01085, TEL (413)572-4000

Sample Summary

Client: Olin Corporation
Project/Site: Olin Chemical

TestAmerica Job ID: 360-37596-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
360-37596-1	OC-GW-26	Water	11/11/11 09:35	11/11/11 17:25
360-37596-2	OC-GW-10s	Water	11/11/11 10:20	11/11/11 17:25
360-37596-3	OC-GW-76s	Water	11/11/11 11:25	11/11/11 17:25
360-37596-4	OC-GW-24	Water	11/11/11 09:35	11/11/11 17:25
360-37596-5	OC-GW-25	Water	11/11/11 08:35	11/11/11 17:25

Method: 6010B - Dissolved Metals - Dissolved

Client Sample ID: OC-GW-26
Date Collected: 11/11/11 09:35
Date Received: 11/11/11 17:25

Lab Sample ID: 360-37596-1
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		100	13	ug/L			11/23/11 14:22	1
Chromium	**6.1**		5.0	0.65	ug/L			11/23/11 14:22	1

Client Sample ID: OC-GW-10s
Date Collected: 11/11/11 10:20
Date Received: 11/11/11 17:25

Lab Sample ID: 360-37596-2
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	**3600**		100	13	ug/L			11/23/11 14:34	1
Chromium	ND		5.0	0.65	ug/L			11/23/11 14:34	1

Client Sample ID: OC-GW-76s
Date Collected: 11/11/11 11:25
Date Received: 11/11/11 17:25

Lab Sample ID: 360-37596-3
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		100	13	ug/L			11/23/11 14:37	1
Chromium	**2.3**	**J**	5.0	0.65	ug/L			11/23/11 14:37	1

Client Sample ID: OC-GW-24
Date Collected: 11/11/11 09:35
Date Received: 11/11/11 17:25

Lab Sample ID: 360-37596-4
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		100	13	ug/L			11/23/11 14:40	1
Chromium	ND		5.0	0.65	ug/L			11/23/11 14:40	1

Client Sample ID: OC-GW-25
Date Collected: 11/11/11 08:35
Date Received: 11/11/11 17:25

Lab Sample ID: 360-37596-5
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		100	13	ug/L			11/23/11 14:43	1
Chromium	**2.4**	**J**	5.0	0.65	ug/L			11/23/11 14:43	1

General Chemistry

Client Sample ID: OC-GW-26
Date Collected: 11/11/11 09:35
Date Received: 11/11/11 17:25

Lab Sample ID: 360-37596-1
Matrix: Water

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	32		2.0	2.0	mg/L			11/21/11 19:58	1
Chloride	330		10	10	mg/L			11/21/11 20:14	10
Ammonia	47		1.0	1.0	mg/L		11/23/11 09:19	11/23/11 15:08	10
Specific Conductance	1200		1.0	1.0	umhos/cm			11/19/11 08:45	1

Client Sample ID: OC-GW-10s
Date Collected: 11/11/11 10:20
Date Received: 11/11/11 17:25

Lab Sample ID: 360-37596-2
Matrix: Water

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	69		2.0	2.0	mg/L			11/21/11 21:35	1
Chloride	20		1.0	1.0	mg/L			11/21/11 21:35	1
Ammonia	4.0		0.10	0.10	mg/L		11/30/11 10:45	11/30/11 16:26	1
Specific Conductance	220		1.0	1.0	umhos/cm			11/19/11 08:46	1

Client Sample ID: OC-GW-76s
Date Collected: 11/11/11 11:25
Date Received: 11/11/11 17:25

Lab Sample ID: 360-37596-3
Matrix: Water

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	38		2.0	2.0	mg/L			11/21/11 22:07	1
Chloride	4.3		1.0	1.0	mg/L			11/21/11 22:07	1
Ammonia	6.7		0.10	0.10	mg/L		11/30/11 10:45	11/30/11 16:27	1
Specific Conductance	150		1.0	1.0	umhos/cm			11/19/11 08:48	1

Client Sample ID: OC-GW-24
Date Collected: 11/11/11 09:35
Date Received: 11/11/11 17:25

Lab Sample ID: 360-37596-4
Matrix: Water

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	53		2.0	2.0	mg/L			11/21/11 22:39	1
Chloride	13		1.0	1.0	mg/L			11/21/11 22:39	1
Ammonia	36		0.40	0.40	mg/L		11/30/11 10:45	11/30/11 16:52	4
Specific Conductance	340		1.0	1.0	umhos/cm			11/19/11 08:49	1

Client Sample ID: OC-GW-25
Date Collected: 11/11/11 08:35
Date Received: 11/11/11 17:25

Lab Sample ID: 360-37596-5
Matrix: Water

Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	96		20	20	mg/L			11/21/11 20:46	10
Chloride	110		10	10	mg/L			11/21/11 20:46	10
Ammonia	36		0.40	0.40	mg/L		11/30/11 10:45	11/30/11 16:53	4
Specific Conductance	770		1.0	1.0	umhos/cm			11/19/11 08:51	1

Client: Olin Corporation
Project/Site: Olin Chemical

TestAmerica Job ID: 360-37596-1

Qualifiers

Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
☼	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CNF	Contains no Free Liquid
DL, RA, RE, IN	Indicates a Dilution, Reanalysis, Re-extraction, or additional Initial metals/anion analysis of the sample
EDL	Estimated Detection Limit
EPA	United States Environmental Protection Agency
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
RL	Reporting Limit
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Metals

Analysis Batch: 83882

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37596-1	OC-GW-26	Dissolved	Water	6010B	
360-37596-1 DU	OC-GW-26	Dissolved	Water	6010B	
360-37596-1 MS	OC-GW-26	Dissolved	Water	6010B	
360-37596-2	OC-GW-10s	Dissolved	Water	6010B	
360-37596-3	OC-GW-76s	Dissolved	Water	6010B	
360-37596-4	OC-GW-24	Dissolved	Water	6010B	
360-37596-5	OC-GW-25	Dissolved	Water	6010B	
LCS 360-83882/1	Lab Control Sample	Total/NA	Water	6010B	
LCSD 360-83882/13	Lab Control Sample Dup	Total/NA	Water	6010B	
MB 360-83882/2	Method Blank	Total/NA	Water	6010B	

General Chemistry

Analysis Batch: 83626

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37596-1	OC-GW-26	Total/NA	Water	SM 2510B	
360-37596-2	OC-GW-10s	Total/NA	Water	SM 2510B	
360-37596-3	OC-GW-76s	Total/NA	Water	SM 2510B	
360-37596-4	OC-GW-24	Total/NA	Water	SM 2510B	
360-37596-5	OC-GW-25	Total/NA	Water	SM 2510B	
LCS 360-83626/1	Lab Control Sample	Total/NA	Water	SM 2510B	
MB 360-83626/3	Method Blank	Total/NA	Water	SM 2510B	

Prep Batch: 83810

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37596-1	OC-GW-26	Total/NA	Water	Distill/Ammonia	
LCS 360-83810/2-A	Lab Control Sample	Total/NA	Water	Distill/Ammonia	
MB 360-83810/1-A	Method Blank	Total/NA	Water	Distill/Ammonia	

Analysis Batch: 83913

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37596-1	OC-GW-26	Total/NA	Water	L107-06-1B	83810
LCS 360-83810/2-A	Lab Control Sample	Total/NA	Water	L107-06-1B	83810
MB 360-83810/1-A	Method Blank	Total/NA	Water	L107-06-1B	83810

Prep Batch: 84076

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37596-2	OC-GW-10s	Total/NA	Water	Distill/Ammonia	
360-37596-3	OC-GW-76s	Total/NA	Water	Distill/Ammonia	
360-37596-4	OC-GW-24	Total/NA	Water	Distill/Ammonia	
360-37596-5	OC-GW-25	Total/NA	Water	Distill/Ammonia	
LCS 360-84076/2-A	Lab Control Sample	Total/NA	Water	Distill/Ammonia	
MB 360-84076/1-A	Method Blank	Total/NA	Water	Distill/Ammonia	

Analysis Batch: 84104

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37596-1	OC-GW-26	Total/NA	Water	300.0	
360-37596-1	OC-GW-26	Total/NA	Water	300.0	
360-37596-2	OC-GW-10s	Total/NA	Water	300.0	
360-37596-3	OC-GW-76s	Total/NA	Water	300.0	
360-37596-4	OC-GW-24	Total/NA	Water	300.0	
360-37596-5	OC-GW-25	Total/NA	Water	300.0	

General Chemistry (Continued)

Analysis Batch: 84104 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 360-84104/4	Lab Control Sample	Total/NA	Water	300.0	
MB 360-84104/3	Method Blank	Total/NA	Water	300.0	

Analysis Batch: 84183

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
360-37596-2	OC-GW-10s	Total/NA	Water	L107-06-1B	84076
360-37596-3	OC-GW-76s	Total/NA	Water	L107-06-1B	84076
360-37596-4	OC-GW-24	Total/NA	Water	L107-06-1B	84076
360-37596-5	OC-GW-25	Total/NA	Water	L107-06-1B	84076
LCS 360-84076/2-A	Lab Control Sample	Total/NA	Water	L107-06-1B	84076
MB 360-84076/1-A	Method Blank	Total/NA	Water	L107-06-1B	84076

Method: 6010B - Dissolved Metals

Lab Sample ID: MB 360-83882/2
Matrix: Water
Analysis Batch: 83882

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aluminum	ND		100	13	ug/L			11/23/11 14:19	1
Chromium	ND		5.0	0.65	ug/L			11/23/11 14:19	1

Lab Sample ID: LCS 360-83882/1
Matrix: Water
Analysis Batch: 83882

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	5000	5100		ug/L		102	80 - 120
Chromium	1000	1010		ug/L		101	80 - 120

Lab Sample ID: LCSD 360-83882/13
Matrix: Water
Analysis Batch: 83882

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aluminum	5000	5030		ug/L		101	80 - 120	2	20
Chromium	1000	994		ug/L		99	80 - 120	1	20

Lab Sample ID: 360-37596-1 MS
Matrix: Water
Analysis Batch: 83882

Client Sample ID: OC-GW-26
Prep Type: Dissolved

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Aluminum	ND		5000	4540		ug/L		91	75 - 125
Chromium	6.1		1000	909		ug/L		90	75 - 125

Lab Sample ID: 360-37596-1 DU
Matrix: Water
Analysis Batch: 83882

Client Sample ID: OC-GW-26
Prep Type: Dissolved

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Aluminum	ND		ND		ug/L		NC	20
Chromium	6.1		5.82		ug/L		5	20

Method: 300.0 - Chloride & Sulfate

Lab Sample ID: MB 360-84104/3
Matrix: Water
Analysis Batch: 84104

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Sulfate	ND		2.0	2.0	mg/L			11/21/11 17:49	1
Chloride	ND		1.0	1.0	mg/L			11/21/11 17:49	1

Lab Sample ID: LCS 360-84104/4
Matrix: Water
Analysis Batch: 84104

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Sulfate	80.0	81.1		mg/L		101	85 - 115

Method: 300.0 - Chloride & Sulfate (Continued)

Lab Sample ID: LCS 360-84104/4
Matrix: Water
Analysis Batch: 84104

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	40.0	40.7		mg/L		102	85 - 115

Method: L107-06-1B - Nitrogen Ammonia

Lab Sample ID: MB 360-83810/1-A
Matrix: Water
Analysis Batch: 83913

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 83810

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	ND		0.10	0.10	mg/L		11/23/11 09:19	11/23/11 14:25	1

Lab Sample ID: LCS 360-83810/2-A
Matrix: Water
Analysis Batch: 83913

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 83810

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Ammonia	10.0	10.4		mg/L		104	90 - 110

Lab Sample ID: MB 360-84076/1-A
Matrix: Water
Analysis Batch: 84183

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 84076

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Ammonia	ND		0.10	0.10	mg/L		11/30/11 10:45	11/30/11 16:18	1

Lab Sample ID: LCS 360-84076/2-A
Matrix: Water
Analysis Batch: 84183

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 84076

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Ammonia	10.0	9.85		mg/L		99	90 - 110

Method: SM 2510B - Conductivity, Specific Conductance

Lab Sample ID: MB 360-83626/3
Matrix: Water
Analysis Batch: 83626

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Specific Conductance	ND		1.0	1.0	umhos/cm			11/19/11 08:19	1

Lab Sample ID: LCS 360-83626/1
Matrix: Water
Analysis Batch: 83626

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Specific Conductance	1410	1400		umhos/cm		99	85 - 115

TestAmerica Westfield

Analytical Dilution Preparation Log

Date: 11-21-11

Analyst Initials	Date	Method	LIMs Sample ID	Rpt'd Dil.	Sample Aliquot 1	Units	Final Volume 1	Units	Serial Dilution				Comments
									Sample Aliquot 2	Units	Final Volume 2	Units	
RWE	11-21-11	300.0	37596 B1	10X	1	mL	10	mL					
↓	↓	↓	↓ B2	↓	↓	↓	↓	↓					
			B3										
			B4										
↓	↓	↓	↓ B5	↓	↓	↓	↓	↓					

entries completed by day [new page each day]

TestAmerica Westfield

Analytical Dilution Preparation Log

Date: 11-23-11

Analyst Initials	Date	Method	LIMs Sample ID	Rpt'd Dil.	Sample Aliquot 1	Units	Final Volume 1	Units	Serial Dilution				Comments
									Sample Aliquot 2	Units	Final Volume 2	Units	
RWE	11-23-11	NH3	37526A3A	10X	1	mL	10	mL					
			MS	10X	1								
			MSD	10X	1								
			37525A2A	10X	1	mL	10	mL					
			37526A1A	10X	1								
			A2A	10X	1								
			A4A	10X	1								
			A5A	10X	1								
			A6A	10X	1								
			A7A	10X	1								
			A8A	10X	1								
			MS	10X	1								
			MSD	10X	1								
			37527B1	10X	1								
			37552B6A	10X	1								
			B7A	10X	1								
			B8A	10X	1								
			B9A	10X	1								
			37596A1A	10X	1								

entries completed by day [new page each day]

TestAmerica Westfield

Analytical Dilution Preparation Log

Date: 11-23-11

Analyst Initials	Date	Method	LIMs Sample ID	Rpt'd Dil.	Sample Aliquot 1	Units	Final Volume 1	Units	Serial Dilution				Comments
									Sample Aliquot 2	Units	Final Volume 2	Units	
RJF	11-23-11	NH3	37526A6A	50X	200	uL	10	mL					
"	"	"	37552B7A	50X	"	"	"	"					

entries completed by day [new page each day]

12/2/2011

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TestAmerica Westfield

Analytical Dilution Preparation Log

Date: 11-30-11

Analyst Initials	Date	Method	LIMs Sample ID	Rpt'd Dil.	Sample Aliquot 1	Units	Final Volume 1	Units	Serial Dilution				Comments
									Sample Aliquot 2	Units	Final Volume 2	Units	
RLE	11-30-11	NH3	375916AHA	10X	1	mL	10	mL					
↓	↓	↓	↓ ASA	10X	1	mL	10	mL					
↓	↓	↓	↓ AHA	4X	2.5	mL	10	mL					
↓	↓	↓	↓ ASA	4X	2.5	mL	10	mL					

entries completed by day [new page each day]

12/2/2011

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Lab Chronicle

Client: Olin Corporation
Project/Site: Olin Chemical

TestAmerica Job ID: 360-37596-1

Client Sample ID: OC-GW-26

Lab Sample ID: 360-37596-1

Date Collected: 11/11/11 09:35

Matrix: Water

Date Received: 11/11/11 17:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Analysis	6010B		1	83882	11/23/11 14:22	TJS	TAL WFD
Total/NA	Analysis	SM 2510B		1	83626	11/19/11 08:45	AMS	TAL WFD
Total/NA	Prep	Distill/Ammonia			83810	11/23/11 09:19	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		10	83913	11/23/11 15:08	RWE	TAL WFD
Total/NA	Analysis	300.0		1	84104	11/21/11 19:58	RWE	TAL WFD
Total/NA	Analysis	300.0		10	84104	11/21/11 20:14	RWE	TAL WFD

Client Sample ID: OC-GW-10s

Lab Sample ID: 360-37596-2

Date Collected: 11/11/11 10:20

Matrix: Water

Date Received: 11/11/11 17:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Analysis	6010B		1	83882	11/23/11 14:34	TJS	TAL WFD
Total/NA	Analysis	SM 2510B		1	83626	11/19/11 08:46	AMS	TAL WFD
Total/NA	Analysis	300.0		1	84104	11/21/11 21:35	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			84076	11/30/11 10:45	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		1	84183	11/30/11 16:26	RWE	TAL WFD

Client Sample ID: OC-GW-76s

Lab Sample ID: 360-37596-3

Date Collected: 11/11/11 11:25

Matrix: Water

Date Received: 11/11/11 17:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Analysis	6010B		1	83882	11/23/11 14:37	TJS	TAL WFD
Total/NA	Analysis	SM 2510B		1	83626	11/19/11 08:48	AMS	TAL WFD
Total/NA	Analysis	300.0		1	84104	11/21/11 22:07	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			84076	11/30/11 10:45	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		1	84183	11/30/11 16:27	RWE	TAL WFD

Client Sample ID: OC-GW-24

Lab Sample ID: 360-37596-4

Date Collected: 11/11/11 09:35

Matrix: Water

Date Received: 11/11/11 17:25

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Analysis	6010B		1	83882	11/23/11 14:40	TJS	TAL WFD
Total/NA	Analysis	SM 2510B		1	83626	11/19/11 08:49	AMS	TAL WFD
Total/NA	Analysis	300.0		1	84104	11/21/11 22:39	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			84076	11/30/11 10:45	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		4	84183	11/30/11 16:52	RWE	TAL WFD

Lab Chronicle

Client: Olin Corporation
Project/Site: Olin Chemical

TestAmerica Job ID: 360-37596-1

Client Sample ID: OC-GW-25
Date Collected: 11/11/11 08:35
Date Received: 11/11/11 17:25

Lab Sample ID: 360-37596-5
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Dissolved	Analysis	6010B		1	83882	11/23/11 14:43	TJS	TAL WFD
Total/NA	Analysis	SM 2510B		1	83626	11/19/11 08:51	AMS	TAL WFD
Total/NA	Analysis	300.0		10	84104	11/21/11 20:46	RWE	TAL WFD
Total/NA	Prep	Distill/Ammonia			84076	11/30/11 10:45	RWE	TAL WFD
Total/NA	Analysis	L107-06-1B		4	84183	11/30/11 16:53	RWE	TAL WFD

Laboratory References:

TAL WFD = TestAmerica Westfield, Westfield Executive Park, 53 Southampton Road, Westfield, MA 01085, TEL (413)572-4000

Certification Summary

Client: Olin Corporation
Project/Site: Olin Chemical

TestAmerica Job ID: 360-37596-1

Laboratory	Authority	Program	EPA Region	Certification ID
TestAmerica Westfield	Connecticut	State Program	1	PH-0494
TestAmerica Westfield	Maine	State Program	1	MA00014
TestAmerica Westfield	Massachusetts	State Program	1	M-MA014
TestAmerica Westfield	New Hampshire	NELAC	1	2539
TestAmerica Westfield	New York	NELAC	2	10843
TestAmerica Westfield	North Carolina	North Carolina DENR	4	647
TestAmerica Westfield	Rhode Island	State Program	1	LAO00057

Accreditation may not be offered or required for all methods and analytes reported in this package. Please contact your project manager for the laboratory's current list of certified methods and analytes.

State Accreditation Matrix

Method Name	Description	State where **Primary** Accreditation is Carried		
		New Hampshire (NELAC)	Mass	Conn
821-R-02-012	Toxicity, Acute (48-Hour)(list upon request)	NP		
SM 4500 Cl F	Chlorine, Residual		NP	
SM 9215E	Heterotrophic Plate Count (SimPlate)		P	
SM 9222D	Coliforms, Fecal (Membrane Filter)		P/NP	
SM 9223	Coliforms, Total, and E.Coli (Colilert-P/A)		P	
SM 9224	Coliforms, Total, and E.Coli (Enumeration)		P	
1103.1	E.coli		ambient/ source	
Enterolert	Enterococcus			
200.8 Rev 5.4	Metals (ICP/MS) (list upon request)	NP/P	NP/P	
200.7 Rev 4.4	Metals (ICP)(list upon request)	NP/P	NP/P	
6010B/C	Metals (ICP)(list upon request)	NP/SW		
245.1	Mercury (CVAA)	NP/P	NP	
7470A	Mercury (CVAA)	NP		
7471A	Mercury (CVAA)	SW		
SM 2340B	Total Hardness (as CaCO3) by calculation	NP/P	NP	
3005A	Preparation, Total Recoverable or Dissolved Metals	NP/P		
3010A	Preparation, Total Metals	NP/P		
3020A	Preparation, Total Metals	NP/P/SW		
3050B	Preparation, Metals	SW		
504.1	EDB, DBCP and 1,2,3-TCP (GC)	P	P	
608	Organochlorine Pest/PCBs (list upon request)	NP	NP	
625	Semivolatile Org Comp (GC/MS)(list upon request)	NP	NP	
3546	Microwave Extraction	SW		
3510C	Liquid-Liquid Extraction (Separatory Funnel)	NP		
3550B	Ultrasonic Extraction	SW		
8081AB	Organochlorine Pesticides (GC)(list upon request)	NP/SW		
8082/A	PCBs by Gas Chromatography(list upon request)	NP/SW		
8270C/D	Semivolatile Comp.(GC/MS)(list upon request)	NP/SW		
CT ETPH	Conn - Ext. Total petroleum Hydrocarbons (GC)	NP/SW		NP/SW
MA-EPH	Mass - Extractable Petroleum Hydrocarbons (GC)	NP/SW		
524.2	Volatile Org Comp (GC/MS)(list upon request)	P	P	
524.2	Trihalomethane compounds	P	P	
624	Volatile Org Comp (GC/MS)(list upon request)	NP	NP	
5035	Closed System Purge and Trap	SW		
5030B	Purge and Trap	NP		
8260B/C	Volatile Org Comp. (GC/MS)(list upon request)	NP/SW		
MAVPH	Mass - Volatile Petroleum Hydrocarbons (GC)			
180.1	Turbidity, Nephelometric	P	P	
300	Anions, Ion Chromatography	NP/P	NP/P	
410.4	COD	NP	NP	
1010	Ignitability, Pensky-Martens Closed-Cup Method	SW		
10-107-06-2	Nitrogen, Total Kjeldahl	NP	NP	
7196A	Chromium, Hexavalent	NP/SW		
9012A	Cyanide, Total and/or Amenable	NP/SW		
9030B	Sulfide, Distillation (Acid Soluble and Insoluble)	NP		
9045C	pH	SW		
L107041C	Nitrogen, Nitrate	NP	P	
L107-06-1B	Nitrogen Ammonia	NP	NP	
L204001A CN	Cyanide, Total	P	NP/P	
L210-001A	Phenolics, Total Recoverable	NP	NP	
SM 2320B	Alkalinity	NP/P	NP/P	
SM 2510B	Conductivity, Specific Conductance	NP/P	NP/P	
SM 2540C	Solids, Total Dissolved (TDS)	NP/P	NP/P	
SM 2540D	Solids, Total Suspended (TSS)	NP	NP	
SM 3500 CR D	Chromium, Hexavalent	NP		
SM 4500 H+ B	pH	NP/P	NP/P	
SM 4500 NO2 B	Nitrogen, Nitrite	NP	P	
SM 4500 P E	Phosphorus, Orthophosphate	NP/P	NP	
SM 4500 P E	Phosphorus, Total	NP	NP	
SM 4500 S2 D	Sulfide, Total	NP		
SM 5210B	BOD, 5-Day	NP	NP	
SM 5310B	Organic Carbon, Total (TOC)	NP/P	NP	

Not all organic compounds are accreditied under NELAC
For methods with multiple compounds all compounds may not meet NELAC criteria, listing should be obtained from the laboratory
The lab carries additional accreditations with several states. This is the laboratories typcial listing but is subject to change based on the laboratories current certification standing.

Login Sample Receipt Checklist

Client: Olin Corporation

Job Number: 360-37596-1

Login Number: 37596

List Source: TestAmerica Westfield

List Number: 1

Creator: Beaumier, Janine E

Question	Answer	Comment
Radioactivity either was not measured or, if measured, is at or below background	N/A	
The cooler's custody seal, if present, is intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

TestAmerica Westfield
Westfield Executive Park 53 Southampton Road
Westfield, MA 01085
Phone (413) 572-4000 Fax (413) 572-3707

GW

Chain of Custody Record

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Information	Sampler: C. Mazzolini / Brian Grochowski	Lab PM: Becky Mason	Carrier Tracking No(s):	COC No: 017510
Client Contact: James Cashwell	Phone:	E-Mail:		Page: 1 of 1
Company: Olin Corporation				Job #: 360-37596
Address: 51 Eames St	Due Date Requested:			
City: Wilmington	TAT Requested (days): Standard			
State, Zip: MA 01887				
Phone:	Quote #:			
Email:	PO #:			
Project Name/number: Olin Semiannual	WO #:			
Site: Olin Wilmington MA	SSOW#:			

Analysis Requested

Preservation Codes:
A - HCL; B - NaOH; C - Zn Acetate; D - Nitric Acid; E - NaHSO4; F - MeOH; H - Ascorbic Acid; I - Ice; J - DI Water; M - Hexane; N - None; P - Na2O4S; Q - Na2SO3; R - Na2S2SO3; S - H2SO4; Z - other (specify)

Regulatory programs: MCP ☐ GW1/S1 ☐; RCP ☐ CT RSR ☐; DEP Form ☐ EDD Required ☐

Sample Identification	Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (W=water, S=solid, O=waste/oil, BT=Tissue, A=Air)	Sampler's Initials	Field Filtered Sample?	Perform MS/MSD?	Ammonia Leach	Chloride / Sulfate / Sp Cond	Dis. Al / Cr + Field Filtered	Total Number of containers	Special Instructions/Note:
Preservation Code:								S	N	D		
OC-GW-26	11/11/11	0935	G	GW	CM	Y	N	X	X	X	3	
OC-GW-10S	11/11/11	1020	G	GW	CM	Y	N	X	X	X	3	
OC-GW-76S	11/11/11	1125	G	GW	CM	Y	N	X	X	X	3	
OC-GW-24	11/11/11	0935	G	GW	BEC	Y	N	X	X	X	3	
OC-GW-25	11/11/11	0835	G	GW	BEC	Y	N	X	X	X	3	

11/11/11

Possible Hazard Identification
☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☐ Radiological

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
☐ Return To Client ☐ Disposal By Lab ☐ Archive For _____ Months

Deliverable Requested: I, II, III, IV, Other (specify)

Special Instructions/QC Requirements:

Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	11-11-11 1500	AMEC		11-11-11 1500	
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company
	11-11-11 17:35			11/11/11 17:25	TA
Relinquished by:	Date/Time:	Company	Received by:	Date/Time:	Company

Custody Seals Intact: ☐ Yes ☒ No | Custody Seal No.:

Cooler Temperature(s) °C and Other Remarks: 6.0°C wt ice